

MARINE REVIEW.

VOL. XV.

CLEVELAND, O., FEBRUARY 25, 1897.

No. 9.

A Brighter Outlook For the Vessels.

Lake vessel owners have every reason to feel pleased over developments in the iron and steel industry since the break in the steel rail pool and since details of the Carnegie-Rockefeller ore and transportation deal have been coming to light. A statement regarding the lake freight feature of this big transaction, which is published on this page, is reliable in every sentence. It shows that Mr. Rockefeller, with his large vessel interests, is not by reason of this agreement prompted to do anything that would reduce carrying charges on the lakes. On the contrary it may now be said that he is a vessel owner more so than a producer of ore and that his interest will be in the maintenance of liberal carrying charges. The statement referred to seems to bear out fully this feature of the situation.

Another meeting of iron ore producers, representing mines of all the Lake Superior ranges, including the Mesabi, was held in Cleveland, Monday. The Rockefeller interests were represented by Mr. F. T. Gates of New York, who has been in charge of all of Mr. Rockefeller's operations in the ore and vessel business and in the recent agreement with the Carnegie company. Mr. Gates, with the representatives of the Minnesota Iron Co. and the Norrie mine, were of course, the central figures in the meeting. Discussion regarding the possibility of continuing the pool was based on the action of Mr. Rockefeller in turning over to a consuming interest—the Carnegie company—an immense tonnage of ore, on a contract that guarantees a big business for his railway, the Duluth, Mesabi & Northern, at a freight rate that is practically fixed at 80 cents a ton, as the contract provides for an increase in mine royalty corresponding to any decrease that may be made at any time in the rail freight. Thus the question of tonnage for the two iron ore railways of Minnesota—the Duluth & Iron Range and the Duluth, Mesabi & Northern—comes up as another important feature in the affairs of the pool. The Minnesota Iron Co. holds, of course, that Mr. Rockefeller did not act entirely in good faith with the pool in his agreements with the Carnegie interests. The lease of Rockefeller mines on the Mesabi to Carnegie not only shuts off the Minnesota company from opportunity to compete for the sale of a large quantity of ore, but also puts an end to the possibility of the Duluth & Iron Range railway, an adjunct of the Minnesota company, getting any of this tonnage. The Carnegie-Rockefeller agreement was entirely against the interests of the Minnesota company, and while Mr. Gates, the representative of the Rockefeller interests, was ready to go ahead with the pool for another year the Minnesota representatives were not. The Norrie mine owners were also an important factor, as they wanted a very low price fixed upon the product of their big mine, fearing that they would not sell their ore unless the price was made low. A figure somewhat below \$3 a ton was spoken of for the Norrie, but the owners of the mine did not regard it as low enough. It is said that Mr. Gates thereupon agreed to take for the Rockefeller interest the entire product of the Norrie mine at the price spoken of, if the question of price for the Norrie was to remain as the only bar to the continuation of the association. It is said also that he offered concessions to the Minnesota company, with a view to overcoming the disadvantages which they have encountered in the Carnegie deal. The meeting concluded with wide differences between the largest of the ore interests, but with an understanding that the various questions should be taken under advisement and that another meeting is to be held on Monday next. In view of the complicated questions involved in this preliminary meeting, it is the general opinion that the chances are decidedly against a continuance of the pool. There is some talk of maintaining the organization so as to cover reports of sales, etc., even though the pool may go under. The argument in this regard is that in event of a big improvement in the market for ore, there would not be so much difficulty in coming together again and arranging prices.

Notwithstanding these differences between the ore producers, it is well to note that the tendency is toward improvement in all branches of the iron industry, and it has been so since the dissolution of the

steel rail pool. Heavy orders for rails and other steel products have caused a stiffening of pig iron prices, and although there is a very large surplus of Bessemer ore on dock, there is a sign of a better future in actual quotations on the London market covering American rails and American pig iron. There is every reason to expect also a large production of non-Bessemer ores, as it is understood that southern makers of pig iron are now finding it absolutely impossible to compete for business in northern markets where they have been a disturbing element for some time past. Cost of production in these markets has been reduced below the southern level. Vessel owners may yet be paid better freights in 1897 than they expected a few weeks ago, especially if they do not attempt to hurry matters in their dealings with the ore producers.

An Authoritative Statement.

An editorial in *Iron Age* of Feb. 18, 1897, purports to give with unerring accuracy the principal facts in regard to the Carnegie-Oliver-Rockefeller agreement. We have it on the very best authority that this editorial article is itself in error in several important particulars, notably in the matter of the agreement respecting the lake freight rate to be paid by the Carnegie interests to the Rockefeller boats annually for transporting the ore. The editorial declares that the Rockefeller boats are to carry the ore "at the average lake freight rate for the season, which must not in any event exceed 70 cents maximum."

Here is where the New York journal is in error. The Rockefeller-Carnegie agreement as to lake freight rates provides for neither a maximum nor a minimum rate. So far as anything in this agreement is concerned, either expressed or implied, the freight rate may rise to any conceivable figure. The agreement provides simply this: That the Carnegie and Rockefeller interests will seek at the opening of the season, to fix a rate mutually satisfactory. If they fail to fix such rate during the season, they may fix it at the close of the season. Failing to fix the rate at the close of the season they mutually agree to take the average of both contract and wild rates for the season between Lake Superior and Lake Erie ports, whatever that may be. This average is not the average of daily rates but is computed by ascertaining the rate actually paid on each ton shipped during the season.

The *Iron Age* was misled by erroneous information regarding the way in which 70 cents actually figures in the contract. Pending the final settlement, the Carnegie interest agrees to pay provisionally 70 cents per ton on each cargo, this being the figure supposed to represent approximately the cost of handling. But this figure is exclusively provisional and temporary, having no relation whatever in any season to the final settlement for that season.

After a great deal of delay, due to labor troubles and other causes, the Brown Hoisting & Conveying Machine Co. is now putting the finishing touches on minor parts of the car dumper machine of new design erected on the docks of the Cleveland & Pittsburg Railroad Co., Cleveland. Four other machines of this kind—two at Toledo, one at Huron and one at Ashtabula—are well along towards completion, and it is confidently expected that they will be ready for the opening of navigation, as their completion depends mainly upon minor alterations that may be made as a result of tests now being conducted with the Cleveland machine. From a mechanical standpoint this new car dumper is even more wonderful than any of the others now in use. The workmanship is of the very finest kind. In the transfer of coal from the car to large bottom-dump buckets, and then to the vessel, every movement is of an easy, sliding kind, and it is more than probable that there will be less breakage of the coal with the machine than would occur in the old system of shoveling from cars to buckets. When the several machines of this type are completed there will be ten car dumpers at Lake Erie ports, four of which are in Cleveland.

The wooden steamer *Helena* has been fitted with an electric light plant.

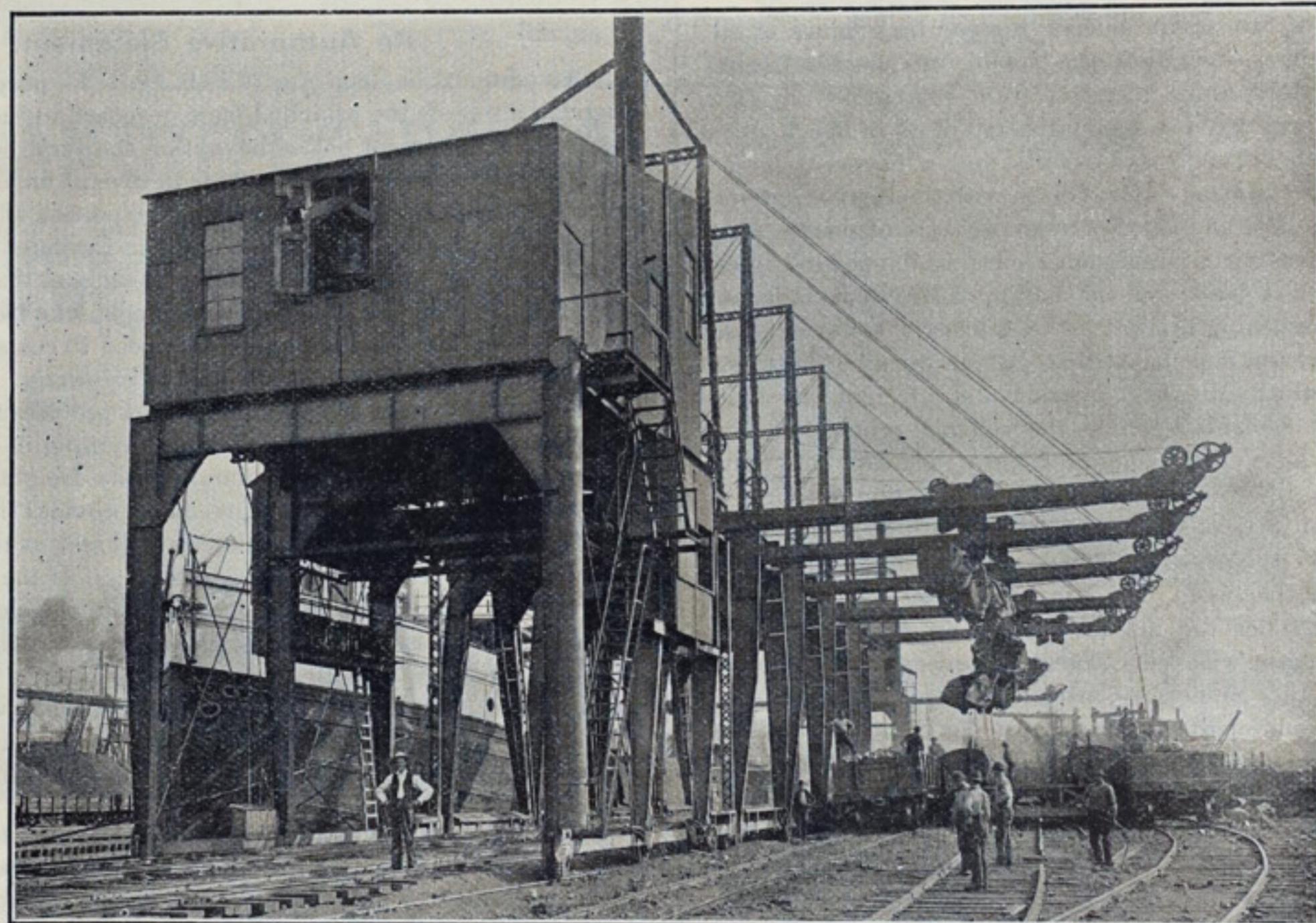
Fast Ore Plant on C. & P. Docks, Cleveland.

Two illustrations of one of the fastest plants on the lakes for unloading ore are presented on this and the opposite page. This plant is known as the Brown patent movable conveying apparatus for the rapid handling of coal and ore. It was built by the Brown Hoisting & Conveying Machine Co. of Cleveland and is in use on the Cleveland & Pittsburg Railroad Co.'s docks, Cleveland. The illustrations do not show the full extent of machinery now in use, as the plant has been increased to eight legs since the photographs were taken. On several occasions during the past season records made at this plant, which is used almost exclusively for loading ore direct into cars, have been among the best ever attained on the lakes. The dock management is quite certain of its ability during the coming season to unload with this machinery a cargo of 4,200 gross tons in twelve hours. The entire plant is movable parallel to the water front, and there are six tracks to the rear of it on which to handle the large supply of cars necessary to the rapid work which it is capable of performing. The tramway projection over vessel is 30 feet, while the extension of cantilevers over railway tracks is 33 feet. It will readily be seen that

Government Mail Service at the Sault.

Editor Marine Review:—Your article in Marine Review of the 18th inst., in relation to the United States government establishing free mail delivery service at Sault Ste. Marie, is a clear statement of the needs of such service. A system that has worked so admirably at Detroit on an analogous waterway, where vessels pass and crews remain on board, and that has been commended generally throughout the chain of lakes, may with equal facility and essential advantage be applied to the Sault river.

The postal service at Detroit for the comparatively insignificant fleet of earlier years was quite satisfactorily rendered by private enterprise, each vessel owner being assessed an annual fee to meet the expense. But the present stupendous fleet of over 3,000 craft could not receive proper and adequate postal benefits in this way; besides vessels should not be taxed to do work that is properly the function of the general government. The vessel owners of the lakes are gratified that the system of free marine delivery at Detroit is to be continued by the postoffice department, and trust the same system will be applied at Sault Ste. Marie, where it is urgently needed, more especially because



FAST BROWN PLANT ON C. & P. R. R. CO.'S DOCKS, CLEVELAND—FOR UNLOADING ORE DIRECT TO CARS.
Rear view showing cantilevers over several tracks.

coal can be handled from cars to vessel with this plant just as the ore is removed from vessel to cars, but the Brown company has just completed a special car dumping machine for the loading of coal on these docks, and this will practically put an end to the handling of coal by the method of shoveling into buckets.

Another fast plant of this kind, and one even larger than that illustrated herewith, is now nearing completion on the Erie & Pittsburg company's docks, Erie, Pa. The Erie plant will have twelve legs and an extension suited to the storage of ore, as well as the more important work of loading direct into cars.

When Going to

Pittsburgh take Pennsylvania No. 10, "The Flyer." Leaves Union station 8 a. m. daily, Euclid avenue 8:10 a. m.; arrives Pittsburgh 11:30 a. m. Solid vestibuled train, Pullman Buffet Parlor car attached to train.

Apl 15

Smooth roadway, quick time, perfect passenger service, uniformed train porters for the convenience of first and second-class patrons, through sleeping cars between Chicago, Buffalo, New York and Boston, unexcelled dining cars and no change of cars for any class of patrons between Chicago and New York city via the Nickel Plate road.

4 Mar 31

private enterprise in postal delivery at that point has fallen far short of meeting the necessities of the situation. B. L. Pennington.

Cleveland, Feb. 24, 1897.

Editor Marine Review:—I should like to see the free mail delivery service (marine service) established at Sault Ste. Marie for the special reason that whether a vessel will use the American or Canadian lock depends upon circumstances which the captain can not foresee until he arrives nearly at the "Soo." Therefore, without such a service as has been established at Detroit, there is no certainty that letters addressed to a passing vessel at the "Soo" will be delivered.

J. J. H. Brown.

Buffalo, N. Y., Feb. 24, 1897.

Editor Marine Review:—The establishment of a free mail delivery service in the Detroit river was a splendid step in the right direction and in the line of progress. The establishment of free delivery mail service at Sault Ste. Marie would also be another step in the right direction. The mail service of the lakes can not be made too good.

Cleveland, Feb. 24, 1897.

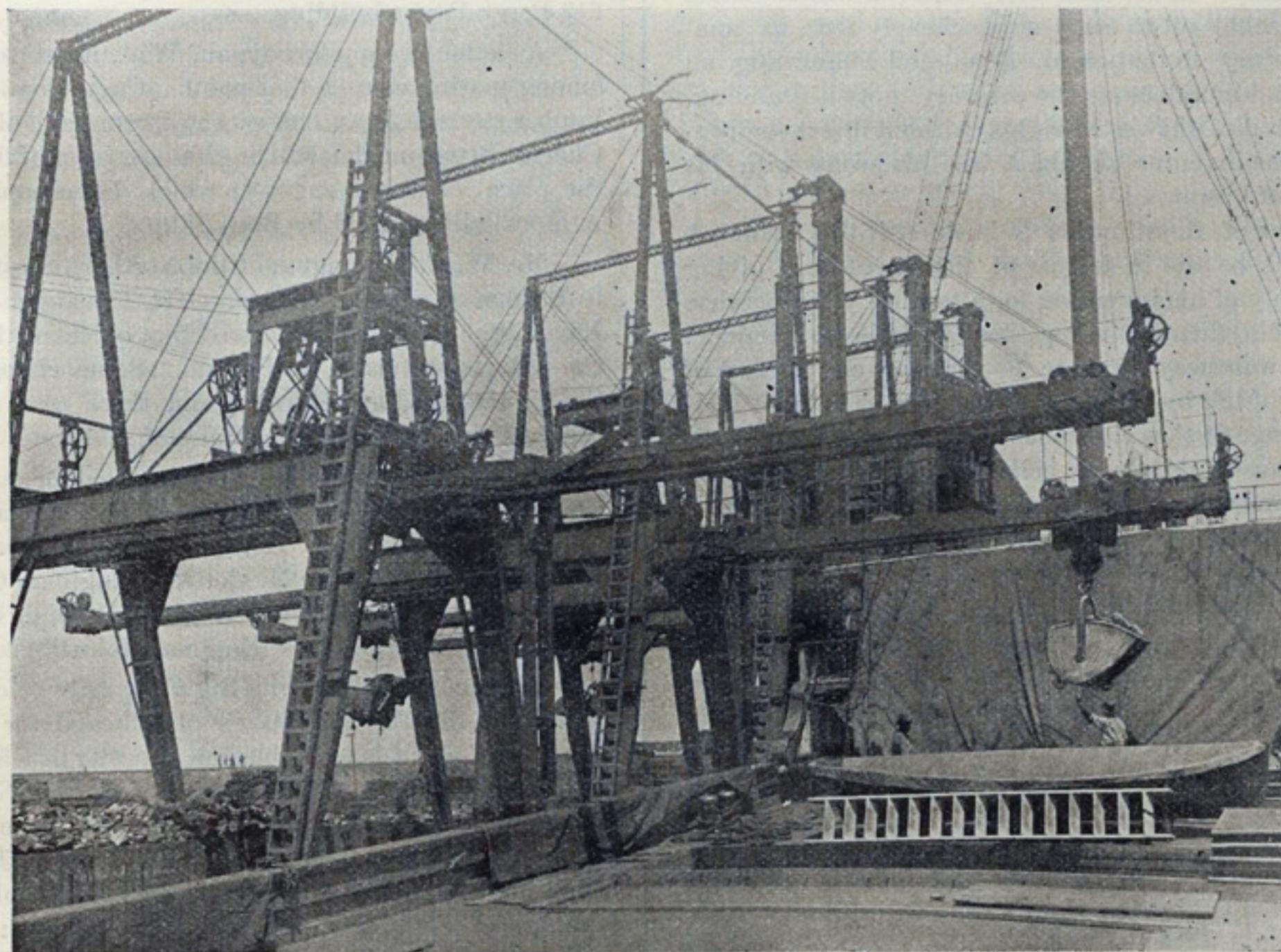
J. H. Sheadle.

It takes thirty-seven specially constructed and equipped steamers to keep the sub-marine telegraph cables of the world in repair.

Against the Toledo-Detroit Car Ferries.

On several occasions of late the Railway Review of Chicago has denounced car ferry companies of the kind now operating car-carrying tow-barges on Lake Michigan between Peshtigo and Chicago. The promoters of the proposed new line between Toledo and Detroit, which is planned on a basis entirely similar to the Lake Michigan line, are of course subjected to similar criticisms. The Review says in its last issue: "Managers of the new company which proposes to operate between Detroit and Toledo are enthusiastic over the prospects, basing their views upon the proposition that the Lake Michigan Car Ferry Transportation Co. has been successful and is now on a paying basis. It is not known upon what authority this statement is made, but it is confidently predicted that an examination of the books of that company would show the reverse to be true. The entire proposition is a violation of all transportation theories. It is the constant effort of carriers, both by water and rail, to reduce the percentage of dead to live load to a minimum. To this end the government is importuned to enlarge locks and deepen channels, so that the carrying capacity of vessels may be increased, while the mechanical departments of our

age of a 'basing point' as one of its terminals. Further than this it serves a local territory, and for both reasons the rates obtained for transportation are reasonable for the distance carried. The Detroit-Toledo line occupies no such position. As a general proposition the rates from all points to both of these cities are practically identical. The car ferry can not expect to do any local business between the two cities and hence can obtain for its service only a small proportion of the competitive through rate. The distance between the two cities is comparatively short, and the railroad service besides being ample, is at water grade. Upon what transportation theory, therefore, the projectors of the new line predicate their success, is somewhat difficult to perceive. Not only will there be a dearth of actual revenue, but it is doubtful if conditions are not such as to make its competition of no moment to the railroads. With the Lake Michigan scheme the case is different; it can maintain a severe competitive position as regards the roads which it parallels, and even if it can not make any money by the operation, there is some prospect of compelling the roads to buy it off; whereas in the Detroit-Toledo line there can be no reasonable expectation of such a result."



FAST BROWN PLANT ON C. & P. R. R. CO.'S DOCKS, CLEVELAND—FOR UNLOADING ORE DIRECT TO CARS.
River front view showing tramway projection over vessel.

railroads are using their utmost endeavors to construct a car that will carry the largest possible load with the smallest possible dead weight. This is made necessary by reason of the constantly declining scale of transportation charges. Thirty-five years ago a steamboat of 500 tons capacity was a profitable investment as a freight boat on the lakes, but today such a venture would be unthought of. Twenty-five years ago ten tons was the ordinary load of a box car whose dead weight exceeded those figures, while today we are building cars of 100,000 pounds capacity weighing less than 40,000 pounds. Now comes the car ferry, and in the face of the necessity which has compelled these changes in construction, proposes to increase the proportionate dead weight by an extra vehicle and in a greater ratio than has ever been attempted. The entire lading of the cars it is proposed to transport would come far short of exhausting the carrying capacity of the boats used for this service, and if, as is the case, it is found practically impossible for water routes to compete with parallel rail routes, even under the most favorable circumstances, it requires no very great insight to determine that such a scheme as that of the Detroit-Toledo car ferry can only result in loss so far as the business of transportation is concerned.

"The Detroit-Toledo scheme is even more unfortunate than its predecessor on Lake Michigan. The Lake Michigan line has the advan-

"There is no possible objection to a car ferry when confined to its proper sphere. On the contrary, when as an adjunct to a railroad it supplies what would otherwise require an expensive bridge structure, it possesses a positive advantage. Indeed, it may be questioned if the time element in our railroad operation has not been given too much consideration, and some bridges, as well as tunnels, built at a cost that would have been more cheaply supplied by the car ferry. But when it is attempted to put loaded cars upon steamboats and transport them over routes paralleled by and in competition with railroads, one of two things is apparent: either it is a case of blackmail so to speak, or the projectors desire to afford another exemplification of the old adage that 'a fool and his money are soon parted.' "

Thirty-three firms compose the Atlantic and Gulf Coast Dredge Owners' Association. The board of directors, elected at the meeting held in Baltimore a few days ago, is composed of P. S. Ross of New Jersey, L. Y. Schermerhorn of Philadelphia, A. R. Wright of Portland, C. H. Souther of Boston, C. P. Lampee and Geo. Leary of New York, C. W. Pusey of Wilmington and Frank A. Furst of Baltimore.

Take the Nickel Plate road to Boston. Through sleepers from Chicago.

2 Mar 31

Moral Side of Waterway Improvements.

In view of the large appropriations that have been made by the government recently for river and harbor improvements under the system of continuous contracts, two or three of the railway journals have contained articles questioning the right of the government to make such appropriations. Extracts from some of these articles have been published in the Review. The main claim is to the effect that there is no justice in the expenditure of public money for the improvement and maintenance of water routes that are depleting the revenues of rail routes, and thereby destroying the property of those who have honestly invested their money therein. These claims, as a whole, are well answered in a communication from L. M. Haupt of Philadelphia, a well-known student of matters of this kind, who says:

"I may answer these questions in the Yankee fashion by asking another, viz., is it right to neglect our opportunities, to bury our talents in a napkin, and to neglect to utilize and develop to their utmost extent the provisions made by an all-wise Creator for the benefit of mankind? Is it not the duty of an engineer, from the very definition of his profession, to apply the resources of nature to the wants of man? Is it morally wrong to improve and cheapen the cost of transportation for the benefit of humanity? If so, then every railroad which makes an improvement that enables it to carry more cheaply than its competitor is working an injury to that organization and committing an immoral act, lawyers and moralists to the contrary notwithstanding. Then all progress which disturbs vested rights, without direct compensation, is wrong and the inventor should divide his profits with his competitors in his line of business.

What would become of the stimulus to business if this principle prevailed? What shall be said in defense of the patent law, giving an individual a monopoly of his invention for a term of years because he makes a better article than his competitors are able to produce? When it is seen that a waterway can save 60 per cent. on the cost of moving the necessities of life by rail, shall any one assert that it is immoral to take advantage of this enormous economy for the benefit of mankind merely because railroads are believed to have vested rights which no one and no condition should interfere with?

"Fortunately, however, the results is not an injury to the railroad nor the public, for there is a broad underlying general principle which many persons interested in railroads do not appear to appreciate. They seem to have the idea that a deep waterway would destroy the railroad interests. My belief after years of investigation is that, on the contrary, it will be greatly beneficial to the earning power of the railroad, and I will take the liberty of directing those who are of the opposite opinion to a paper which I have just prepared on 'The Railways in Politics, and to refer to another paper published in the proceedings of the International Deep Waterways Association, on 'Sectionalism and Railways vs. Deep Waterways,' giving stock quotations of railways having cheap water competition as contrasted with interior lines having none, which should afford an index to the result of such alleged competition in benefiting the railroad. The sooner our country awakens to the importance of more fully utilizing her natural high ways of commerce the sooner will the long expected boom of prosperity overtake us, and the harder will it be for adversity to shake our financial institutions, while it will also increase the revenues of our railroads."

Although Chicago receives very little soft coal by lake, on account of ample rail facilities provided from the mining districts of Ohio, Indiana and Illinois, the receipts of hard coal from Buffalo and Erie by water show a steady increase each year. Figures carefully collected from all of the coal dealers show receipts of anthracite by lake in 1896 aggregating 1,319,693 net tons. The companies and the amounts they received in tons are as follows: O. S. Richardson & Co., 234,906; Lehigh Valley Coal Co., 201,519; Coxe Bros. & Co., 152,000; E. L. Hedstrom & Co., 150,375; Robert Law, 124,291; Crescent Coal & Mfg. Co., 116,535; Philadelphia & Reading Coal & Iron Co., 113,710; Peabody Coal Co., 80,739; Youghiogheny & Lehigh Coal Co., 57,953; Pennsylvania Coal Co., 43,988; Wm. Drieske, 28,545; Drieske & Hinnens, 8,495; Otto Schuenemann, 6,637; total, 1,319,693.

The Journal of the American Society of Naval Engineers for February reprints the paper on "Hollow Steel Forgings," which was read some time ago before the American Society of Mechanical Engineers by Mr. H. F. J. Porter of Chicago, who is western agent for the Bethlehem Iron Co.

Around the Lakes.

The father of Capt. Ole Groh, well known in marine circles on Lake Michigan, died at his home in Sheboygan, Wis., Thursday.

There are probably no two vessels on the lakes that resemble each other as much as do the steamers J. J. McWilliams and Lagonda.

The Hiram W. Sibley is said to be the only steamer now on the lakes that carries four spars and four top-masts. A few years ago most of the lake steamers carried the large spars. The Sibley is owned by Benj. Boutell of Bay City, and tows the schooner Twin Sisters.

A telegram from Marine City to Mitchell & Co. of Cleveland announces the death of Capt. Chris. Peterson, who has been in command of vessels of the Gratwick fleet for about six years past. Capt. Peterson was in the steamer McWilliams last season and had been in command also of the Sauber and the wooden steamer Gratwick.

Announcement is made of the dissolution of the Cleveland firm of Bartow & Gilchrist, vessel and insurance agents. Mr. J. H. Bartow, who recently became associated with the new ore firm of Drake, Bates & Co., announces that he will also continue the business of Bartow & Gilchrist in offices that were occupied by that firm, 611 and 612 Perry Payne building.

A letter from Cheboygan, Wis., notes some changes in berths among marine men at that point. Capt. Connelly, last season in the lumber steamer Joys, has accepted command of the steamer Veronica. Charles Benschneider will be chief engineer of the steamer Omaha, and the place of second engineer which he occupied on the Philip D. Armour will be filled by Emil Jahn.

Mr. W. C. Farrington of the Northern Steamship Company is now in Europe on a wedding tour. Mrs. Farrington was Miss Jenneson of Bay City. It is again rumored that offices of the Northern Steamship Co. will be returned to Buffalo. Some changes are being made in the Lehigh Valley company, and there are rumors also of a new order of things in the lake affairs of that line.

Captains and engineers just appointed for steamers of the Lake Erie Transportation Co., A. W. Colton of Toledo, manager, are as follows: Geo. J. Gould, Capt. Henry Root, Engineer James Miller; S. C. Reynolds, Capt. Walter M. Cottrell, Engineer George Butler; Russell Sage, Capt. T. C. Herrick, Engineer Joseph Kohlbrenner; John C. Gault, Capt. C. H. Lewis, Engineer John Busted.

President Ingalls of the Big Four railway company has arranged with J. C. Shaffer and others of Chicago for the erection of a grain elevator of about 500,000 bushels capacity in Cleveland. The elevator will be located on what is known as the Cincinnati slip, which is owned by the Big Four company, and the contract for building it will probably be let to John S. Metcalf & Co., elevator builders of Chicago. It will be used very largely for supplying grain cargoes to the fleet of steel canal boats, which has been in operation for some time past between Cleveland and New York. The canal boat company will also have, in the same slip, docks and storage sheds for the handling of package freight.

Not long ago the system of skeleton steel frames in the construction of buildings was confined to massive structures of great height. Then it was extended to manufacturing and power plants where great strength was desired and now it is applied to churches, schools and in fact all buildings that are considered at all modern. The development of this branch of the steel industry is wonderful, and the amount of steel used in it is a big item. One of the pioneer concerns in this line of work is the Berlin Iron Bridge Co. of East Berlin, Conn. Of late this company announces two or three contracts a week for steel work on new buildings in different parts of the country.

A catalogue has just been received from Henry R. Worthington of New York, describing the Worthington cooling tower, a water saving device which has recently been patented, and which is now being placed on the market. The importance of this apparatus to ice manufacturers and users of refrigerating machinery may be understood from the claim that it will save from 85 to 95 per cent. of the water required for condensing and cooling purposes in refrigerating and ice making plants, and in locations where the absorption of heat is desirable and there may be a scarcity of water.

Solid through sleeping car trains with dining cars attached are operated by the Nickel Plate road between Chicago, Cleveland, Buffalo and New York City. Through sleeping car to Boston.

3 Mar 31

Ship Yard Matters.

Capt. Thomas Wilson of Cleveland has named his largest vessel, a steel steamer just launched at the yard of the Cleveland Ship Building Company, for Andrew Carnegie. Capt. Willson can probably do this more appropriately than any other vessel owner on the lakes. Both men were born in Scotland, and it is understood that their birth places were not far apart. The new steamer is in every respect a modern lake freighter. Quite a little ceremony attended the launching, which occurred on Saturday last. The vessel is constructed on the channel system and is 400 feet long from the forward side of the stem to the after side of the stern post, 420 feet long over all, 48 feet beam and 28 feet deep. She has a water bottom 5 feet deep, capable of carrying about 2,000 tons of water ballast. There are twelve hatches and three pole spars. Houses are of the usual barge style. A complete electrical lighting plant, steam steering gear, steam windlass and capstan forward, steam capstan aft, and two steam capstans as well as a hoisting engine amidships, are features of the outfit. Cylinders of the triple expansion engines are 23, 38 and 63 inches in diameter with a common stroke of 40 inches. The propeller will be 13 feet in diameter and 17 feet pitch. Steam will be furnished by three Scotch boilers each 12 feet in diameter and 13 feet long, to be allowed a working pressure of 175 pounds of steam to the square inch. It is thought this power will drive the vessel easily 12 miles an hour loaded. The Carnegie should carry 4,000 gross tons of ore on 14½ feet mean draft, or about 6,000 gross tons on 16½ feet. She will be commanded by Capt. B. H. Jones. Frederick Harmon will be chief engineer.

It is understood that as a result of the meeting of creditors of the firm of F. W. Wheeler & Co., held in Detroit a week ago, all arrangements are being made for an issue of bonds amounting to about \$200,000, which will be sufficient to remove the immediate pressure of an indebtedness of about \$180,000 and leave a balance for working account. The people to whom the ship building company is indebted are satisfied that the great bulk of indebtedness is due to improvements in the company's big plant. A warm friendship shown for Mr. Wheeler personally by a great many people interested in the affairs of the company had much to do with the plans that have been made for bridging over the company's embarrassment. The Carnegie Steel Co. is understood to be the principal creditor.

Mr. W. J. Wood of Chicago has prepared for the O. B. Green Dredge Co. of that city plans for a large steel scow, on which bids have been requested from several lake ship builders. Dimensions of the scow are 126 by 30 by 10½ feet. It is understood that two or three other vessels of the same kind are to be built later.

A strange error crept into the Review last week in a short article from West Superior. The term "oak spars" was used. It is, of course, well known that pine is the material used for vessels' spars.

A Compliment to Col. Jared A. Smith.

In a letter to the Army and Navy Journal of New York, a Cleveland correspondent pays a fitting compliment to Col. Jared A. Smith, corps of engineers, U. S. A., whose promotion to the grade of Colonel has resulted from the appointment of Col. John M. Wilson as chief of engineers. The journal's correspondent says: "All here are pleased at the rise to the highest grade in the corps next to the head and the consequent enlargement of his scope of usefulness to the country at large. Col. Smith is a past master in his profession, and possessed of remarkable energy and perseverance to bring upon any questions which pertain to his profession as an engineer and an officer of the army. When his wonderful capacity for dealing with details, his tenacious memory and thoroughly trained business mind are considered, his great success in the many important public works entrusted to his care is readily accounted for. In private life he is a kindly gentleman, courteous and kind to all with whom he comes in contact, socially or officially. It is extremely gratifying to this community especially, as it must be to the army and the country, that the casualties of the service have occasioned the promotion of this distinguished officer."

A telegram from Grand Haven announces the death of Capt. Alvin Dodge, local inspector of hulls in the Grand Haven district. He was fifty-six years of age and had followed the lakes for nearly forty years before being appointed to the government inspection service.

Low Insurance For 1897.

An advertisement elsewhere in this issue announces that the new insurance combination, headed by Charles E. & W. F. Peck of New York, London and Chicago, is in readiness to undertake hull insurance, as well as cargo business, in the latter of which the promoters of the combination have been engaged for some time past. Names of the local concerns connected with the combination, and given out in connection with this business announcement, are Brown & Co. of Buffalo, La Salle & Co. of Duluth and J. G. Keith & Co. of Chicago. The foreign connection is C. T. Bowring & Co. of Nos. 5 and 6 Biliter avenue, E. C., London.

Since the new combination has begun soliciting hull business, all of the general agents who have been doing business on the lakes have been very active in consulting their principals and their customers among vessel owners, either through lengthy correspondence or personal visits. Within the past few days Mr. C. A. Macdonald of Chicago, Mr. F. P. Gordon, representing Johnson & Higgins of New York, and representatives of the firm of Smith, Davis & Co. and other general agents have all been in Cleveland assuring their customers of ability to give them liberal policies and insurance in every way "as good and as cheap as can be had from anybody else." It is understood that a meeting of representatives of several of the lake agencies was held in New York, a few days ago, and that an agreement of some kind may be made up even among these agencies and Johnson & Higgins, notwithstanding the opposition of the regular companies to Johnson & Higgins in the past. In the meantime vessel owners are not worrying about their insurance, as the indications are all in the direction of more liberal policies and lower premiums, especially on the best class of risks, on account of the fight for business that has been stirred up. It can not be learned as yet that there is anything being done towards actually closing up insurance contracts. Some stories are told about the combination threatening to use its control of the cargo business as a leverage against vessel owners who do not place hull business with them, but the best information that can be had is to the effect that the new people in the field are acting conservatively and are proceeding along straight business lines, both in the work of publishing the new register and in their solicitation of insurance.

Poe Lock Is All Right.

Editor Marine Review:—Your note of Feb. 20 is at hand, in which you inform me that from some sources a story has been circulated to the effect that the machinery of the Poe lock at Sault Ste. Marie, Mich., is not powerful enough, and that the service that will be obtained from the lock next season is not likely to be an efficient one. I am very glad that you have given me information of this story, for until your note was received I had no idea that any such wholly erroneous rumors were afloat. They are entirely wrong, and their circulation should be promptly arrested by an authoritative contradiction.

I therefore state that the power available for operating the machinery of this lock is not only amply sufficient, but even more abundantly so than is necessary. It is true that some parts of the machinery did not work with satisfactory smoothness and regularity during the past season, but the experiences of that period clearly indicated the causes of trouble and showed the remedies. The required changes are comparatively few, simple and inexpensive. They are now in progress, will be fully completed before next season's navigation opens, and an efficient service is confidently anticipated as their result. The following record may be of interest in this connection:

COMMERCE PASSING THE ST. MARY'S FALLS CANAL, MICHIGAN, FROM AUGUST 3 TO DECEMBER 10, 1896.

	Poe Lock.	Weitzel Lock.
Total registered tonnage passed.....	2,986,972	3,322,556
Total number of lockages.....	961	2,109
Total time of lockages, hours.....	730	923
Average tonnage per lockage.....	3,109.2	1,575.4
Average tonnage per hour.....	4,094	3,599

It should be understood that during this period the Poe lock was, in reality, simply undergoing a thorough working test of its new and, in some respects, untried machinery; whereas the machinery of the Weitzel lock was thoroughly familiar to the operating force and in perfect working order throughout.

G. J. Lydecker,

Lieut. Colonel, Corps of Engineers, U. S. A.

Detroit, Mich., Feb. 24, 1897.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio,
by John M. Mulrooney and F. M. Barton.SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient
binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross
Steam vessels.....	1,792	924,630.51
Sailing vessels and barges.....	1,125	354,327.60
Canal boats.....	416	45,105.47
Total.....	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	1892	1893	1894	1895	1896
204	169	175	106	93	117	864
111,856.45	45,968.98	99,271.24	41,984.61	36,352.70	108,782.38	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about $\frac{1}{4}$ per cent. of the whole, but largely in American vessels.

It is announced from the New York office of the White Star steamship line that Harland & Wolff of Belfast have been authorized to build for the White Star company's New York and Liverpool service a twin-screw mail and passenger steamer, in which extreme speed is to be subordinated to the comfort and convenience of passengers of all classes. It is said that the vessel will be 704 feet long, or 25 feet longer than the Great Eastern, and about 65 feet longer than any vessel now afloat. In reference to speed it has been determined as far as possible to aim at a regular Wednesday morning arrival both in New York and Liverpool. In her internal arrangements the vessel will be an enlarged reproduction of the Teutonic and Majestic except in so far as improvements may have suggested themselves in the size and fitting of the rooms, and which may be rendered practicable by the increased dimensions of the ship herself. It is expected that the new vessel will be launched in January next. Her name is to be Oceanic, after the pioneer vessel of the company.

According to the best estimates available, which are those prepared by the Lake Carriers' Association, 32,560,000 net tons of freight passed through the Detroit river during the navigation season of less than eight months in 1896. This is an immense commerce, representing the great bulk of the freight movement on the lakes, but there are other parts of the world that show a far greater volume of shipping. The "statistical abstract," an official British document recently submitted to parliament, shows that during 1895 the registered tonnage of British vessels entered and cleared at ports in the United Kingdom from and to foreign countries and British possessions was 58,700,000, while the registered tonnage entered and cleared in the coasting trade of the United Kingdom was 60,800,000. These figures represent an increase in ten years of 12,600,000 registered tons in the foreign trade and 9,400,000 tons in the coasting trade.

Senator Frye is evidently preparing for another effort to bring about important changes in the revenue cutter service. He has secured the passage in the senate of a resolution calling upon the secretary of the treasury to submit information on all provisions of law touching the service, as well as all recommendations regarding the service, made by the several secretaries of the treasury since December, 1869. He also asks for a statement showing the present condition of the service, including vessels under construction and repair, and the force, including commissioned officers and enlisted men. In addition

to this information, the secretary is requested to make such further recommendations as he may deem proper in respect to the necessity of immediate legislation to promote the efficiency of the service.

On Feb. 1 pig iron furnaces in blast throughout the country had a weekly capacity of 162,959 gross tons, against capacity of 159,720 gross tons in Jan. 1. It will thus be seen that the rate of output has been about stationary since the first of the year. Stocks have increased materially since Jan. 1, but it is expected that orders taken recently at low prices in different branches of the steel and iron industries will cause an increase in pig iron production and a reduction in stocks during the coming season.

An effort is being made in the senate to have the naval appropriation bill amended so as to provide for a branch hydrographic office at Duluth, Sault Ste. Marie and Buffalo. The naval affairs committee of the senate favors appropriations for this purpose, and it is to be hoped the amendment will prevail, as officers of the hydrographic service are certainly making great progress in their efforts to be of assistance to the shipping interests of the lakes.

Vessels built throughout the state of Maine in 1896 aggregated only 18,834 tons, and as there were fifty of them the average tonnage was only 376. None of the vessels were over 1,700 tons. In fully half the customs districts of the state, where large ship yards for the construction of wooden vessels were maintained in years past, no vessels of any kind were built.

Lyman J. Gage, who is Major McKinley's choice for secretary of the treasury, will have a great deal to do with the business interests of the country during the next few years, and especially the shipping interests. A complete and accurate account of his life, in a twelve-page illustrated article, has been written for the March Review of Reviews by Major Moses P. Handy.

Says the Story Was Exaggerated.

Editor Marine Review:—I noticed in your issue of the 18th inst. an article relating to Mr. Huff, chief engineer of the Detroit, Belle Isle & Windsor Ferry Co., and his account of a trip he had on the Siberia. I think you have a wrong idea of this matter, and I beg leave to straighten the thing out a little. I saw Mr. Huff shortly after the article appeared in the Detroit Journal and he was greatly embarrassed over it. "What do you think," he asked me, "of that piece they put in the Journal about me. Mr. McCormick, a Journal reporter, was in our office the other day, talking with the manager of our company. 'Huff,' they said, 'tell us of some of your troubles on the lakes,' and I told them about a tumbling we had when I was on the Siberia. I thought no more of it. The reporter remembered what he could and added a great deal more, and that is how Capt. McArthur sat on the steam pipe waiting to die and it is the explanation also of how Eagle Harbor got shifted to Michipocoten island. Anybody to whom the circumstances might be explained would readily understand that Mr. Huff did not tell this story with the idea of having it appear that he was the "only pebble on the beach."

Detroit, Mich., Feb. 24, 1896.

John L. Simmons.

A Mysterious Wreck.

Editor Marine Review:—I write to inquire as to whether any of your readers have ever heard of a schooner being sunk on the east side of Stag island, St. Clair river. Saturday last the water was as clear as crystal and we could see the bottom all the way across the river. Just below the dock on Stag island, we could see plainly the hull of a schooner, or rather the bottom of it. She must have been a standing-keel schooner, as she had no centre-board box. The vessel was about 125 or 130 feet keel and of pretty good beam. Her floors are of 4-inch flitch. I have sailed up and down this river every summer, without missing one, since 1853, and I don't remember ever hearing of a vessel being sunk in this vicinity. We inquired of a man who has lived nearly opposite the wreck for the last fifty years, and he says he knows nothing of a vessel sinking at this point. The wreck is near the channel bank and there is about 14 feet of water over it. The vessel must have rested in the spot that she now occupies for a great many years. Could it be one of the British boats of 1812, or is it a schooner that had aboard the soldiers who died at Fort Gratiot?

Marysville, Mich., Feb. 22, 1897.

T. A. Ellery.

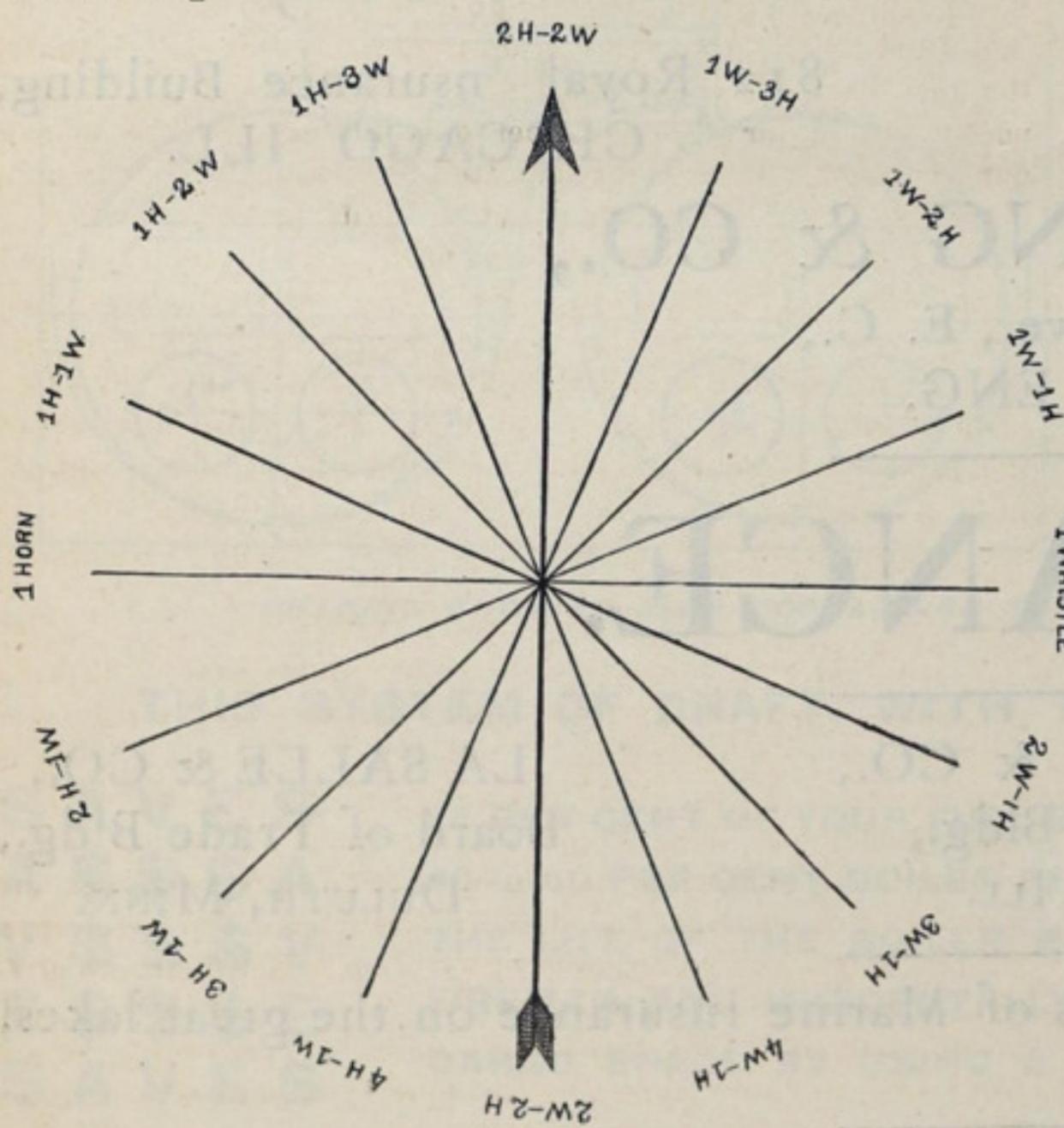
Largest Floating Dock in the World.

The largest floating dock in the world is soon to be erected at the port of Olongapo, Philippine islands, by Robert Stephenson & Co. of Hepburn, England, for the Spanish government. Dimensions of the structure are: Length, 450 feet; width over pontoons, 117 feet; depth to the top of side walls or girders, 38 feet 6 inches. The dock when completed will rest on a series of six pontoons, each of which will be between 13 feet and 14 feet deep. These latter will be constructed of iron, while the side girders, which constitute the walls of the dock, will be of steel. The arrangement of the pontoons will be such that in the event of any of them getting damaged and requiring to be repaired, they can be temporarily detached from the rest of the structure and floated onto the dock itself. The dock is intended to lift vessels up to 12,000 tons, and will have an equipment of four powerful pumping engines, capable of pumping 12,000 tons of water in two hours. Though capable of taking vessels 500 feet long, the weight of which will be pretty evenly distributed over the whole of the structure, it is specially designed to lift vessels of the maximum weight (12,000 tons), the length of which may not exceed 300 feet. The dock is to be built in sections, and will be sent to Olongapo, where it will be finally put together and completed. The builders have had extensive experience in the construction of pontoons, caissons and other dock accessories.

For Navigation in Fog.

Washington, D. C., Feb. 24.—Hon. Robt. J. Kirk, United States consul at Copenhagen, has forwarded to the state department the following explanation of a system of fog signals, stating that the originator, Mr. Christensen, would appreciate expressions of opinion upon the system. Mr. Christensen says:

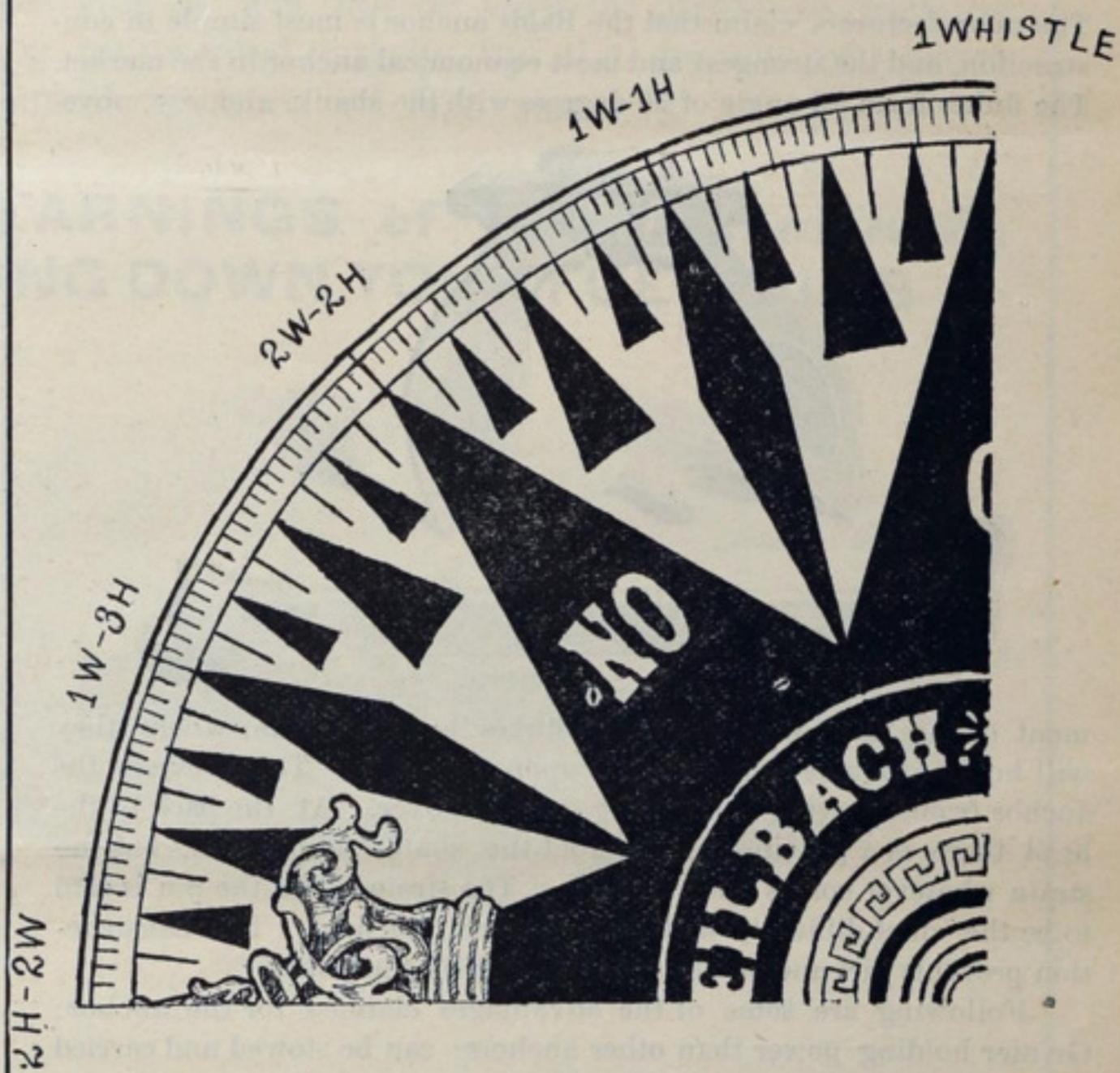
"Among the greatest dangers to navigation is collision caused by fog. This danger arises principally from the fact that although signals can be heard without difficulty in fog, just as in clear weather, it is always difficult on either vessel to determine in what direction the other is moving. In the many collision cases which have come before me as average agent and steamship agent it has generally been proven that this was the cause of collision. To overcome this difficulty as far as possible, I beg to put before you a system of fog signals for steamers, consisting of sirens of two different sounds (whistle and horn) and by means of which a steamer is constantly enabled to signal the course she is steering.



SYSTEM OF SIGNALS FOR NAVIGATION IN FOG.

"As the principal courses in many great waterways are easterly and westerly, I have taken one sound of a whistle to indicate a due easterly course and one sound of a horn to indicate a due westerly course. All other courses to the eastward begin with sound of whistle followed by sound of horn, and all other courses to the westward begin with

sound of horn followed by sound of whistle. For a complete understanding of my system reference is made to the attached charts, which are self-explanatory. To provide steamers with sirens of two different sounds will cost only a trifle, and I can not help thinking that the system is so plain and simple that if it should be adopted as



QUARTER SECTION OF FOG SIGNAL CHART.

an international rule it would greatly lessen the danger from future collisions and save proportionately life and property. Before presenting the system to the American government I consulted several shipmasters and marine officers and they all concur in this opinion."

Vessel Reporting Service.

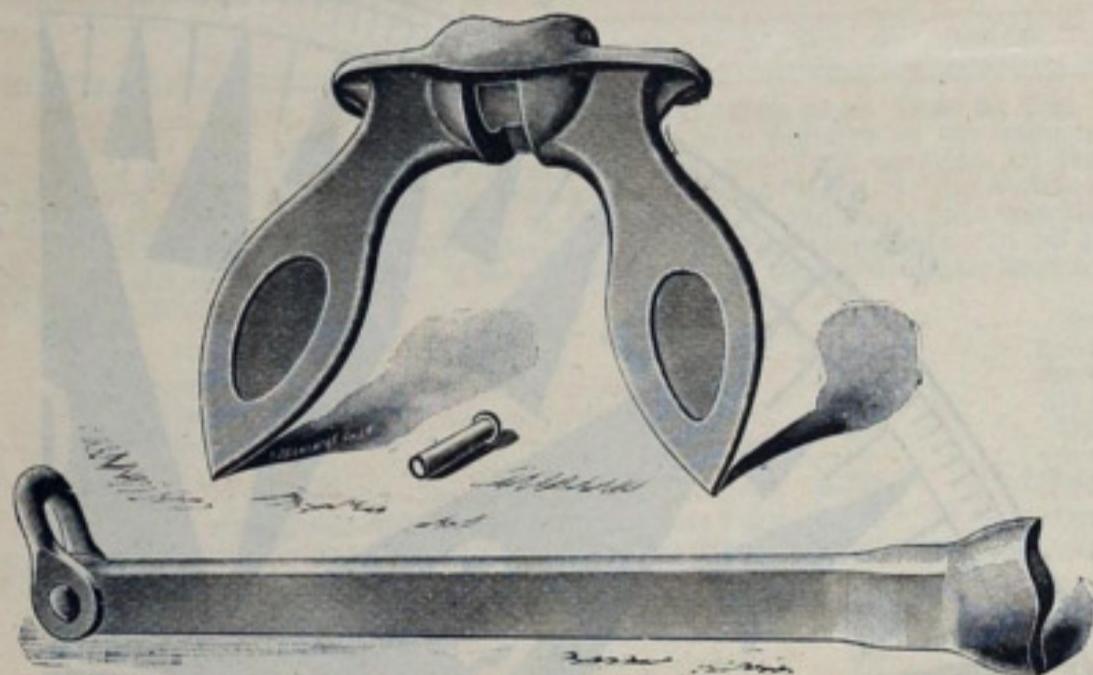
The Lake Marine News Association of Chicago, of which Homer J. Carr is manager, and which furnishes a couple of columns of telegraphic information daily to leading newspapers in all of the lake cities, is gradually extending its service and establishing stations that are engaged exclusively in the work of the organization. This association is maintained by the newspapers on a mutual basis, and was originally intended for newspaper work only, but its facilities for serving vessel owners with direct reports are such that a commercial business of this kind was taken up last season. It is announced now that during the coming season the scope and value of direct reports to vessel owners and shippers will be increased.

The station at Mackinaw City will be continued under the management of C. T. Dagwell. This station furnished all reports of vessels passing Mackinaw published in lake newspapers last season, and the accuracy and fullness of the reports were manifest. The station is located near the point, a handsome house having been built for it, and is fully equipped for efficient service. Not a complaint of boats being missed was received from patrons of last year. The Detour station will remain in charge of M. E. Hazen and Thomas L. Dalton, a full twenty-four hour service being given. In daylight reports are taken from the dock, and in the night-time reporters are stationed on Frying Pan island, near the light-house. Every vessel owner taking reports of Detour passages last season has ordered them continued for next. Some owners, however, who desire but one report from the Sault river have ordered Detour reports instead of the Soo for down-bound boats, as they are then past danger and delay and their time to Port Huron can be easily computed.

The station at Sault Ste. Marie will remain in charge of H. F. Hughart. The fullest facilities for the delivery of orders on both sides of the river, together with the general business of looking after the interests of owners, will be transacted. Messages for down-bound boats directed to the "Soo" will be forwarded to Detour and delivered there without extra expense, if vessels have already passed the "Soo" when messages are received. This will be done without instructions from owners in all cases.

A New Stockless Anchor.

The Baldt stockless anchor is made in two parts, the head forming the crown and flukes with a ball socket in the center, and a shank with a ball at one end, forming a compact and almost indestructible ball and socket. There is no chance of this anchor getting jammed. The manufacturers claim that the Baldt anchor is most simple in construction, and the strongest and most economical anchor in the market. The flukes form an angle of 50 degrees with the shank, and any move-



ment of the latter will throw the flukes to the bottom, where they will hold as soon as a strain is put upon the chain. This prevents the anchor from dragging and rolling over and over. At the back of the head there is a pin inserted to hold the shank in position, but no strain whatever comes upon the pin. The strain upon the pin is said to be the chief difficulty with some modern anchors. The construction prevents dirt and stones accumulating in the joint.

Following are some of the advantages claimed for the anchor: Greater holding power than other anchors; can be stowed and carried in hawse-pipe; direct strain upon the shank causing the flukes to take hold simultaneously; simple construction; moderate cost; made of steel, and many other points that will be explained on application to the Baldt Anchor Co., Chester, Pa. Officers of the company are

Frederick Baldt, president; Wm. Gelston, vice-president, and W. S. Bickley, secretary and treasurer. The company is represented on the lakes by Walter Miller of Cleveland, who has secured orders recently for one anchor of 5,000 pounds, one of 4,000, six of 3,500, one of 1,500 and four 1,200 pounds.

Garlock "Duo" Packing.

With the adoption of the multiple cylinder type of engines heavier and better material has been used in their construction. This also applies to the design, strength of material and construction of the modern steam boiler, steam pipes, fittings and appliances. Valve and piston rod packings that were suitable for packing glands of engines working at a pressure under 100 pounds to the square inch have failed to meet the requirements of the modern steam engine using steam at from 125 to 250 pounds to the square inch. Of course, with the increased pressure of steam we have a much higher temperature. The Garlock Packing Co., fully realizing the importance of meeting all the requirements for a high pressure packing, have been experimenting for a number of years and have produced and placed on the market the Garlock "Duo" packing, which is particularly suited to high pressure steam and hot water purposes, and which is also a packing that works equally well where a low pressure is used. It is guaranteed to give entire satisfaction in all places where a high pressure steam or hot water packing is used.

Capt. Soper of Buffalo has again been appointed to serve as harbor master for two years.

U. S. ENGINEER OFFICE, 1101 D. S. Morgan Building, Buffalo, N. Y., February 15, 1897. Sealed proposals for harbor excavation and construction of timber and concrete breakwater at Dunkirk Harbor, N.Y., under continuous contract, will be received here until 11 o'clock A. M., Monday, March 22, 1897, and then opened. Information furnished on application. T. W. SYMONS, Major, Engrs. Mar. 11

Chas. E. & W. F. Peck,

58 Williams St.,
NEW YORK CITY.

812 Royal Insurance Building,
CHICAGO ILL.

C. T. BOWRING & CO.,
5 & 6 Billiter Ave., E. C.,
LONDON, ENG.

INSURANCE.

BROWN & CO.,
202 Main St.,
BUFFALO, N. Y.

J. G. KEITH & CO.,
138 Rialto Bldg.,
CHICAGO, ILL.

LA SALLE & CO.,
Board of Trade Bldg.,
DULUTH, MINN.

Are prepared to make rates on all classes of Marine Insurance on the great lakes, both CARGOES and HULLS.

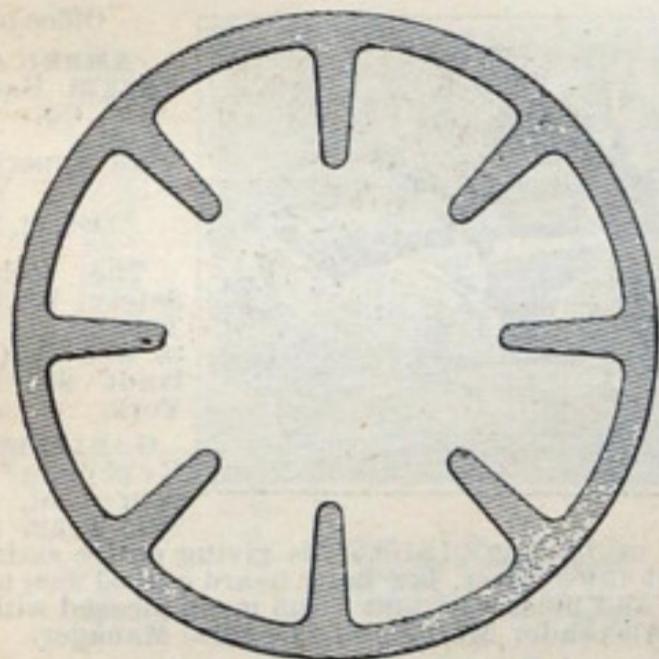
"Great Lakes Register."

F. D. HERRIMAN, Surveyor-General, Chicago, Ill.

THE PRICE TO BE PAID FOR CARRYING ORE

The coming season and the COST of carrying it will not be very far apart—so that the profit on next season's business may be represented largely by the amount of money that can be SAVED by the most economical operation of lake steamers.

**? Do you want to increase the EARNINGS of your steamers ?
Have you any objections to CUTTING DOWN YOUR FUEL BILLS ?**

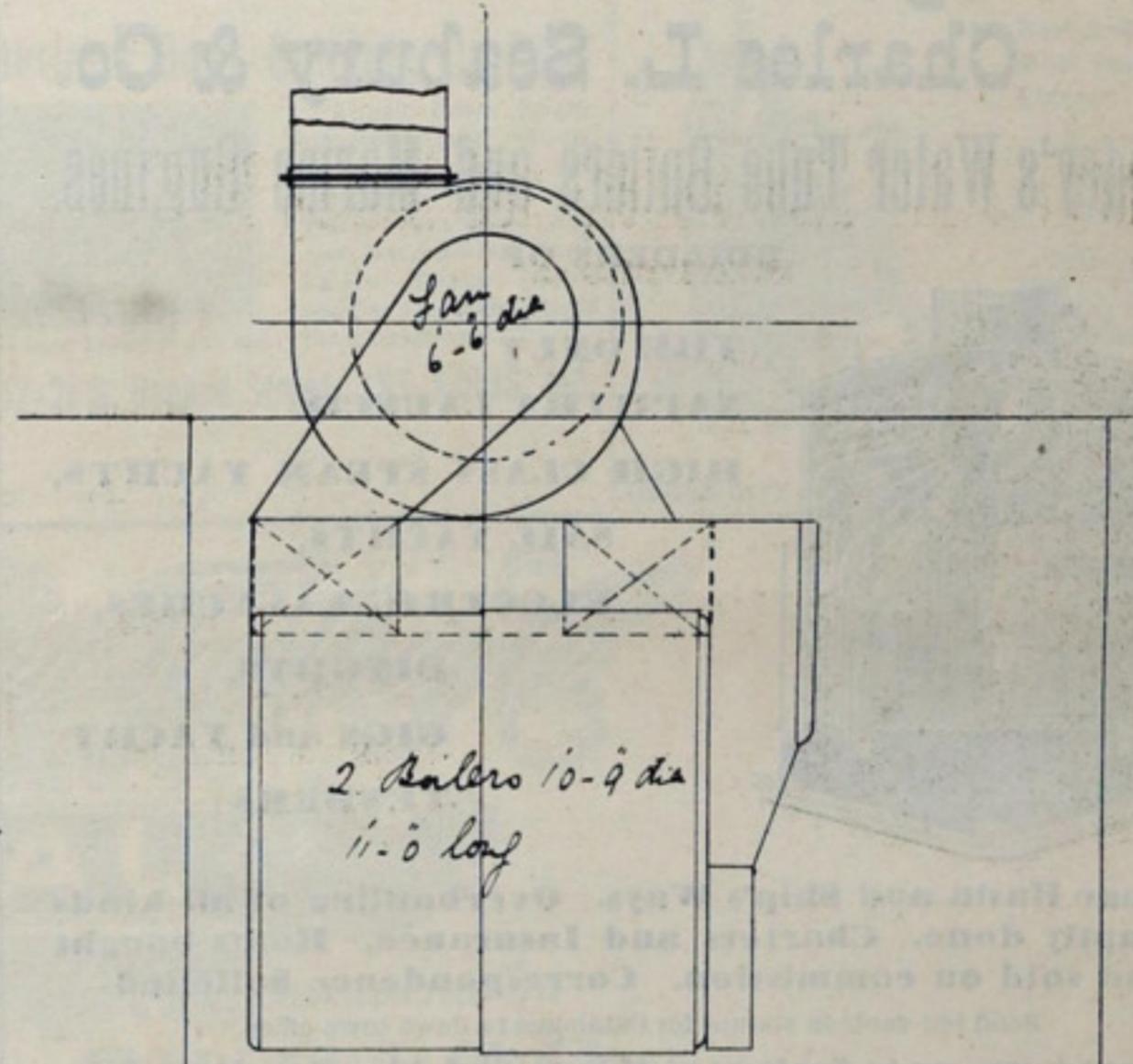
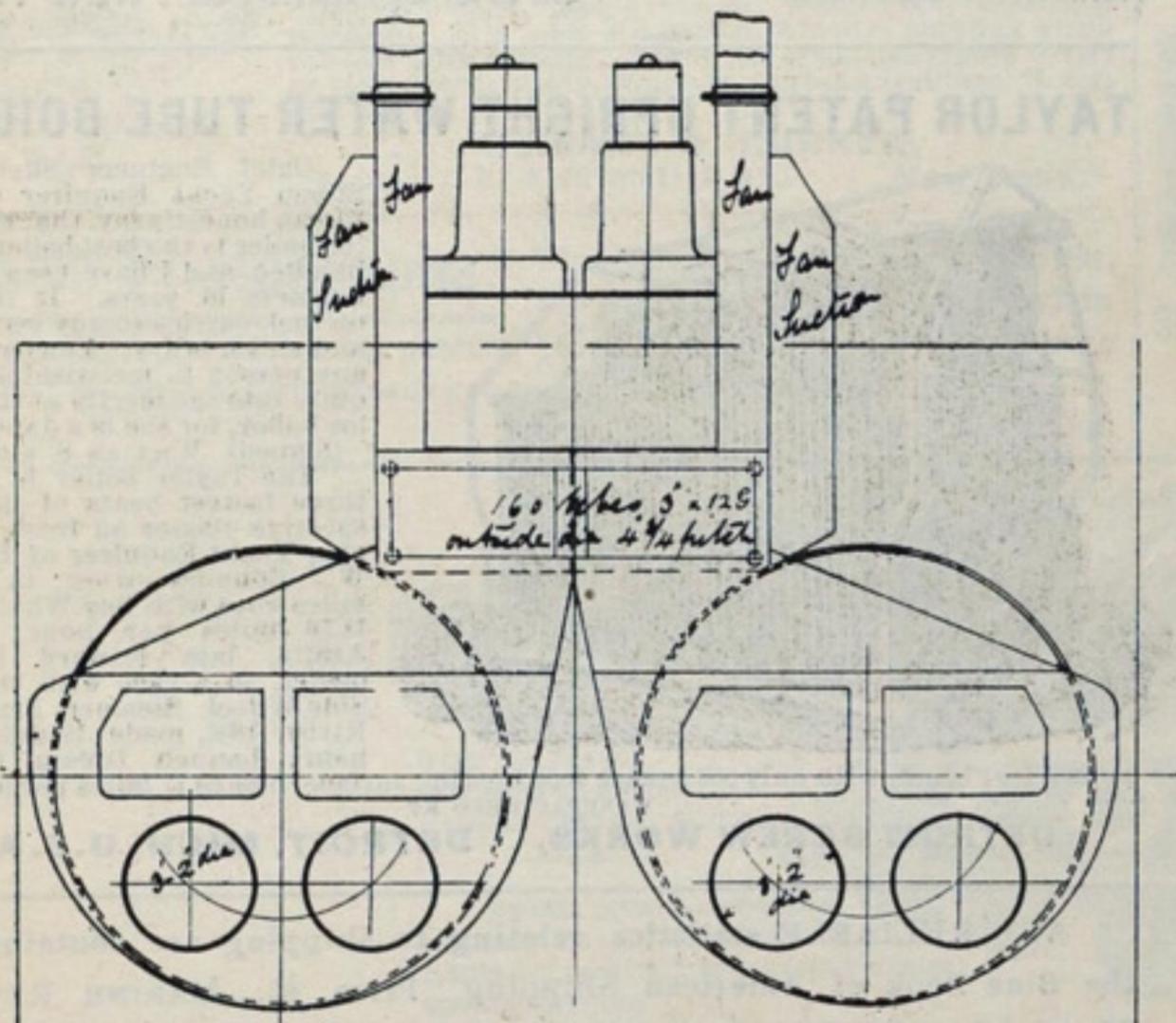


SERVE'S RIBBED TUBES.

Managers of the Trans-Atlantic lines are watching the performance of the steamer on the right, because she burns only 1.22 lbs. coal per horse power per hour. Her boilers are fitted with the tubes shown on the left.



AMERICAN LINER ST. PAUL.



DRAWING SHOWING PLAN FOR ADDING THE ELLIS & EAVES DRAFT TO LAKE STEAMERS.

THIS SYSTEM OF DRAFT, WITH THE SERVE TUBES, SAVES MONEY.

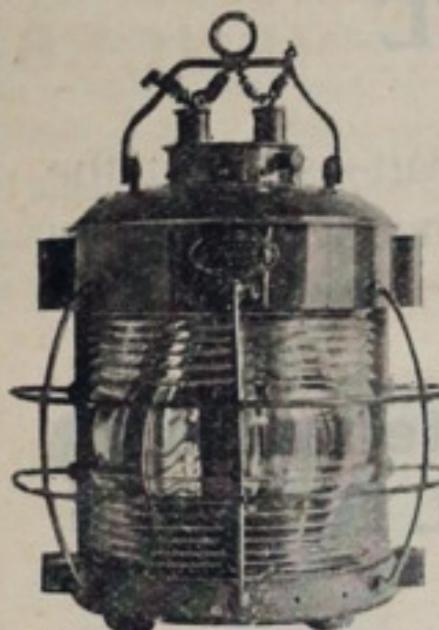
S A V E S
A \$ \$ \$ \$ A
V \$ \$ \$ \$ V
E \$ \$ \$ \$ E
S A V E S

25 PER CENT OF YOUR FUEL BILLS.
40 to 50 PER CENT BOILER CAPACITY.
THE LIFE OF THE BOILER BY DRAWING GASES THROUGH TUBES.
FIREMEN AND INCIDENTALLY THEIR WAGES.
CARGO SPACE BY USING A SMALLER NUMBER OF BOILERS.

For PARTICULARS and PRICES of applying to Steamers already Built and to Steamers Building, apply to

The Globe Iron Works Company, Cleveland, Ohio.

MARINE LAMPS



Oil and Electric Equipment for Steamships, Yachts, etc.
Signal Lights, Saloon Fixtures, Cabin Lamps, Lanterns, etc.



Wm. Porter's Sons,
271 Pearl St., NEW YORK CITY.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, Paid up in Cash, - - - \$3,000,000.00
ASSETS, 9,651,808.08

CHARLES PLATT, President.
EUGENE L. ELLISON, 2nd Vice-President.
JOHN H. ATWOOD, Assistant Secretary.

GEO. H. McFADDEN, Vice-President
GREVILLE E. FRYER, Sec'y. & Treas.

Lake Marine Department.
GEORGE L. McCURDY, Manager
CHICAGO, ILLS.

Gas Engine & Power Co. and
Charles L. Seabury & Co.

Seabury's Water Tube Boilers and Marine Engines.

BUILDERS OF

THE ONLY
NAPHTHA LAUNCH.
HIGH CLASS STEAM YACHTS,
SAIL YACHTS,
ELECTRIC LAUNCHES,
DINGHYS,
GIGS and YACHT
TENDERS.

Storage Basin and Ship's Ways. Overhauling of all kinds promptly done. Charters and Insurance. Boats bought and sold on commission. Correspondence Solicited.

Send ten cents in stamps for Catalogue to down town office,
50 Broadway, or to factory at Morris Heights, New York City.

Chain Department * P. HAYDEN S. H. CO. * Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:
The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—
Stud and Close Link,
Cable Chains.
Write for Prices.

AMERICAN SHIP WINDLASS CO.

"Providence" Windlasses and Capstans

350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

G. H. FOSTER, Prest. MARK H. HANLON, V.-Prest. & Secy. W. H. WARNER, Treas.
DAVID BARNHISEL, Gen'l Mgr.

The Inter-Ocean Coal & Coke Co.

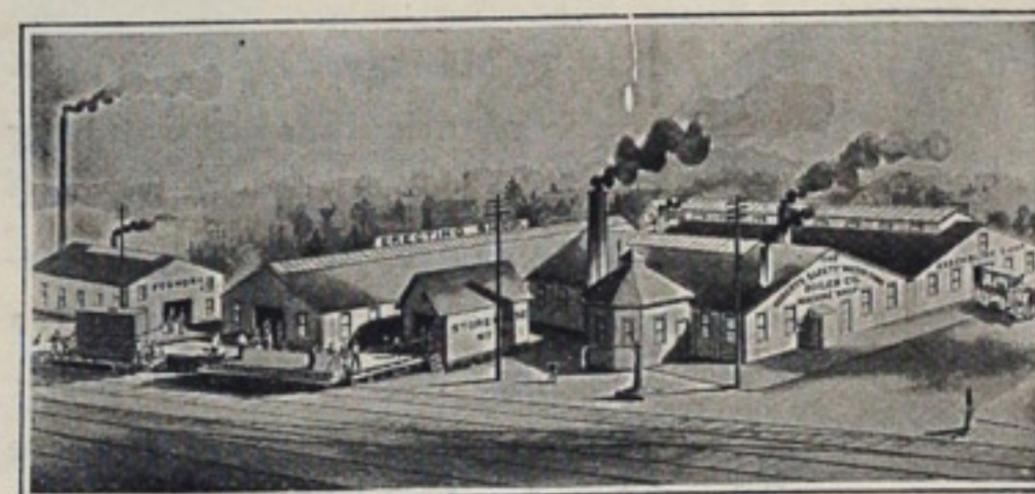
General office, 513 Perry-Payne Bldg., Cleveland.

PRODUCERS AND SHIPPERS.

Choicest Grades of YIOUGHIOGHENY COAL FOR STEAMBOAT FUEL.

Lighter in Cleveland Harbor of 400 tons capacity.

CLEVELAND DOCKS, just north of Main Street bridge.
SAULT RIVER DOCK, just above Detour, known as Watson dock



Office of
AMERICAN
STEEL BARGE
CO.
West Superior
Wis.,
Oct. 31, 1895.

The Roberts
Safety Water
Tube Boiler Co.,
39 and 41 Cort-
landt St., New
York.

Gentlemen:
Replying to
your^d of the
28th I am glad
to say that the boiler you furnished us for tug "ISLAY" is giving entire satisfaction. I have heard no complaint about it whatever, but have heard a good deal in its favor. I ride on the boat frequently and must say that I am much pleased with its work. Very Truly yours,

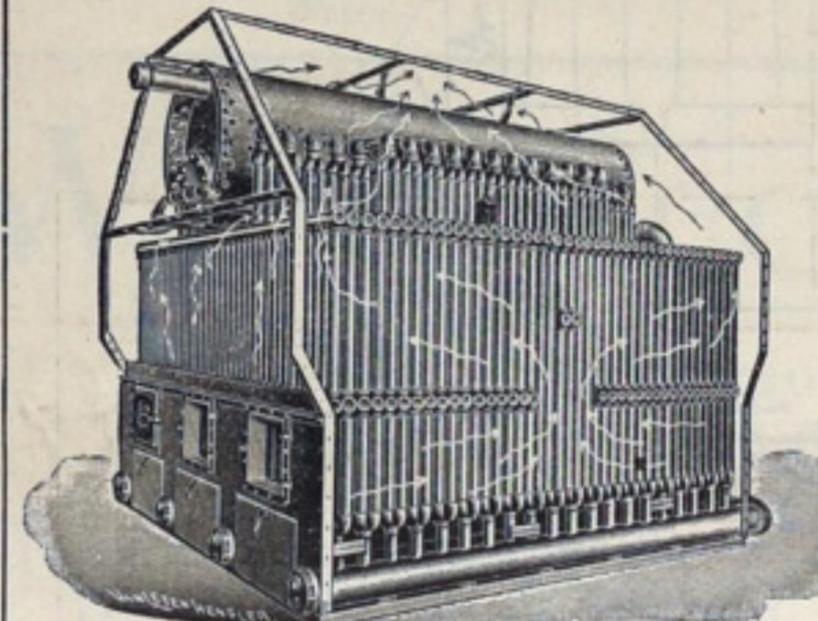
Alexander McDougall, General Manager.

THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest.

Adapted for use in Yachts, Launches, and Vessels of all Kinds.
Handsome Illustrated Circular sent free on application to

The Roberts Safety Water Tube Boiler Co.,
WORKS, RED BANK, N.J.
39 & 41 Cortlandt St., NEW YORK.

TAYLOR PATENT UPRIGHT WATER TUBE BOILER.



long, 9 feet beam, with only 350 square feet heating surface, makes 17 miles per hour.

MANUFACTURED BY

DETROIT SCREW WORKS, DETROIT, MICH. U.S.A.

ALL RELIABLE statistics relating to shipping are contained in the Blue Book of American Shipping. Price, \$5. MARINE REVIEW, Cleveland.

THE ELECTRO DYNAMIC CO.,

224 Chestnut St., Philadelphia.

Electrical Engineers and Mfrs. of Electrical Machinery,
Marine Generating Sets for Supplying Light or Power.

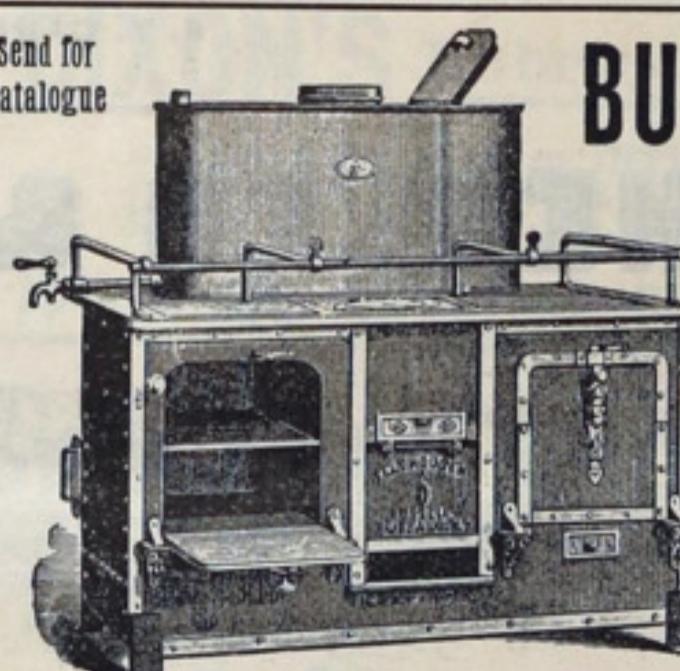
COMPLETE ELECTRICAL MARINE EQUIPMENTS.

Portable Electric Drill Motors now in use at

Cramp & Son's Ship and Engine Building Co.,
Newport News Ship Building and Dry Dock Co.,
Crescent Shipyard.

Union Iron Works,
Brooklyn Navy Yard and
International Navigation Co.

Send for
Catalogue



BUFFALO WROUGHT STEEL RANGES

Steamboat and Vessel
Ranges and Boilers,
with patent Rotary
Grate.

SOMETHING NEW AND GOOD.
We also carry the STAMFORD TUG
AND YACHT GALLEY STOVES.

RUSSELL & WATSON

Successors to Felthousen & Russell.
145 Main St., BUFFALO, N.Y.

PINTSCH GAS LIGHTED BUOYS

Adopted by the English, German, French, Russian, Italian, and United States
Light House Departments, for Channel and Harbor Lighting; over
500 gas buoys and gas beacons in service.

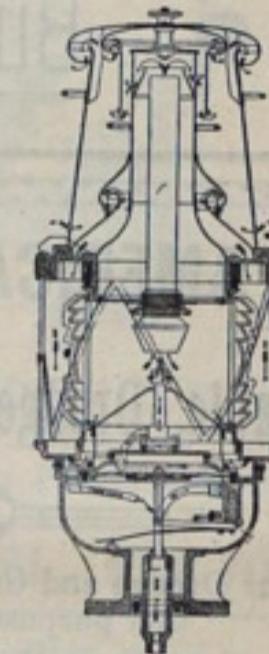
BURN CONTINUOUSLY from 80 to 365 days and nights without attention, and can be seen a
distance of six miles.

Brilliant and Steady Illumination. Economical and Reliable in Operation.

CONTROLLED BY THE

Safety Car Heating & Lighting Company,

160 BROADWAY, NEW YORK CITY.



WM. WILFORD'S

Matchless Water-Proof Canvas.

The best in the market for Hatch Covers, is stronger
lighter and more durable than any Water-Proof Goods yet
produced. It's made of a twisted thread of pure flax which
renders it very strong. It will not crack like Cotton Goods
or take fire as easily, which is a great advantage, if soft
coal is used.

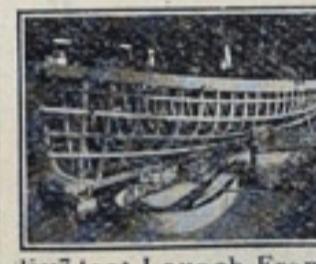
EDWARD A. BUNKER,
Room 617, 27 & 29 WILLIAM ST., NEW YORK.

Artistic Photographs.

The REVIEW has a photographer,
the best on the lakes, engaged in
taking photographs of vessels passing through the Detroit River. Large
pictures. No objectionable background. Let us have your order.

409 Perry-Payne Bldg., Cleveland.

American Boat Building Co. Incorporated.



35x7 foot Launch Frame.

3517-21 S. Second Street, ST. LOUIS, MO.

Knock-Down Boats,
something new. We do
the work, you nail together. Freight low,
prices reasonable. Also com-
pleted Boats, Half-
Raters, Knock-Abouts
and Canoes. Send stamp
for catalogue.

Queen City Hydraulic Steerer.



Best and
Most Powerful
Steerer

FOR TUGS,
STEAMERS,
ETC.

Price—From
\$650 to \$750, ac-
cording to size
and location in
steamer.

Manufactured
by

QUEEN CITY ENGINEERING CO., Buffalo, N.Y.

A. Richardson Fueling Co.

FUELING DOCKS:
NORTH PIER!
18th STREET BRIDGE,
ILLINOIS CENTRAL SLIP C.

STORAGE DOCKS FOR ANTHRACITE:
KINGSBURY ST. BETWEEN INDIANA & ERIE STS.
ELSTON AVE. DIVISION ST. BRIDGE (NORTH BRANCH)
NORTH AVE. BRIDGE.
DIVISION ST. BRIDGE (OGDEN CANAL)
SOUTH HALSTED ST. BRIDGE.

COAL

OFFICE,
225 DEARBORN ST.

CHICAGO.

For Sale:

DREDGES, TUGS and SCOWS.

Two Dredges and six Dump Scows, one Flat Scow,
one Derrick Scow and four Tugs—

One with 15 by 17 engine, allowed 110 lbs. steam.
" " 17 by 16 " 110 " "
" " 20 by 22 " 125 " "
" " 20 by 24 " 110 " "

Inquiries from parties who mean business cheerfully
answered.

JAMES ROONEY, 1118 Collingwood Av., Toledo, O.

P. M. CHURCH & CO.,
SAVINGS BANK BLOCK, SAULT STE. MARIE, MICH
LEADING DEALERS IN

Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc.

FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

JOHN HAUG, Consulting Engineer and Naval Architect.

Ship and Engineer Surveyor Lloyds Register, London.
Plans, Specifications and Superintendence of Ships and their Machinery. Place,
specialties—Bulk Oil Vesse's High Speed Yacht Engines, etc.

206 Walnut
Philadelphia.

The Chase Machine Co.

111 Elm St., Cleveland, O.



MACHINISTS and ENGINEERS

MANUFACTURERS OF
Land and Marine Engines
and Steam Pumps.

SOLE OWNERS AND MANUFACTURERS OF
Chase Fog Whistle Machine.

Over 150 in use on the best class
of Lake Steamers.

Special Attention given to
MARINE REPAIR WORK.

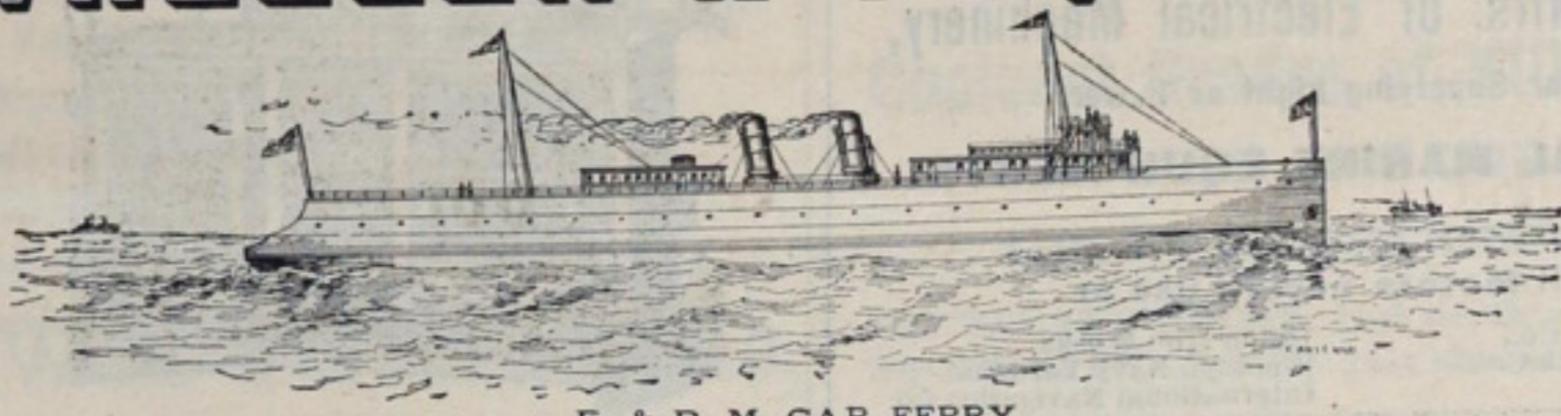
Engineers' Supplies.
Asbestos Pipe and Boiler Covering.
TELEPHONE 984.

F. W. WHEELER,
President.

E. T. CARRINGTON,
Vice-President.

C. W. STIVER,
Secy. and Treas.

F. W. WHEELER & CO., WEST BAY CITY, MICH.



F. & P. M. CAR FERRY.

Builders of all kinds of METAL AND WOODEN SHIPS.

AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting
CHAINS.

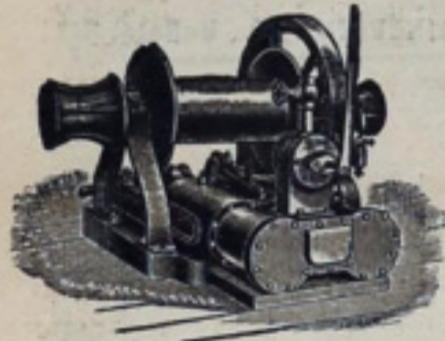
Our Dredge and Crane Chains are made of Iron Rolled Specially for
that purpose in three qualities, "Burden's," "H. B. & I."
iron, and "Burden's Best Best" iron.

THE J. B. CARR COMPANY, TROY, NEW YORK.

THOS. DREIN & SON, TATNALL AND RAILROAD STS.,
WILMINGTON, DEL.



Builders of Metallic
Life Boats and Rafts,
Yachts and Pleasure
Boats. LifePreservers.
Outfit for Lake Steam-
ers a Specialty.



DOCK and DECK HOISTS
ALL KINDS OF
Machinery & Friction Hoists.

SEND FOR PRICES AND CIRCULARS.

JACKSON & CHURCH,
SAGINAW, MICH.

DON'T BLAME THE CAP'T

for last year's misfortune, but instruct him to send 10 cents in stamps for
our 235 page Illus. rated Catalogue, make up his order and send it to us;
he will find it "Chock-a-Block" full of articles needed on every Yacht,
Boat and Canoe afloat.

L. W. FERDINAND & CO.,
176-180 Federal Street, BOSTON, MASS.

HOWARD H. BAKER & Co.

Ship Chandlers and Sail Makers,

18 to 26 Terrace. BUFFALO, N.Y.

H. CHANNON COMPANY

Ship Chandlers and Sail Makers.

AGENTS FOR

RYLANDS BROS.

MANUFACTURERS OF

ENGLISH GALVANIZED STEEL HAWSERS,

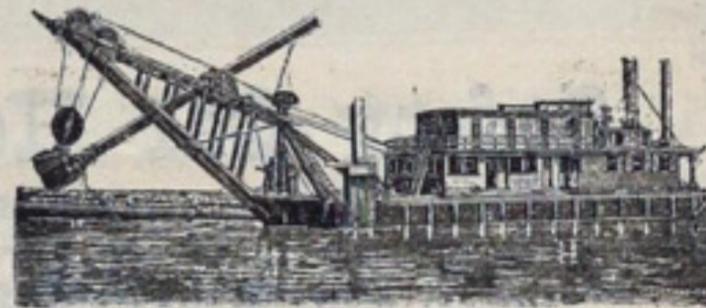
24-26 Market Street, CHICAGO, ILL



THE L. P. & J. A. SMITH CO.,

Contractors of Public Works.

Dredging,
Pile-Driving,
Breakwaters,
Dry Docks and
Pier Building,



Railroads,
Canals,
Bridges,
Foundations,
Etc., etc.

23 River St., CLEVELAND, O.



H. E. STEVENS.

TOM MEAD.

LEW PRESLEY

BUCKEYE STEAM FITTING CO.

Steam Fitters, Engineers Supplies,

Phone 4058.

AGENTS FOR

RAINBOW PACKING.

Open Day and Night.

117 River St., CLEVELAND, O.

The Martin-Barris Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR
CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER
ON SHORT NOTICE.

654 Seneca Street,

Cleveland, Ohio.

DETROIT SHEET METAL
AND BRASS WORKS

No. 64-66-68-70-72
ORLEANS STREET,
DETROIT, MICH.

Jobbers of..... Pipe, Valves, Fittings, Packing, Oil and
Engineers Supplies.

Contractors for High Class Steam Fitting, Steam Heating,
Plumbing, Copper Work, and all
Classes of Sheet Metal Work.

Manufacturers of Clark's Patent Metallic Life Raft, Side
Lights, Marine Hardware, Hurricane
Cabin and Platform Lamps, Trip
Gongs, etc.

Agents for..... Laidlaw - Dunn - Gordon Steam Pumps,
Warren Webster's Specialties, and
Buffalo Forge Co.'s Fans, Engines and
Heaters.

Engineers can be waited on promptly day or night.

DIXON'S Graphite Pipe Joint Compound

Enables you to MAKE A TIGHTER JOINT than you can possibly make with red lead. You can do it easier, and parts can be separated at any time without breaking anything. Send for sample and circular.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

Fred'k Baldt, President.

W. M. Gelston, Vice-President.

W. S. Bickley, Sec'y and Treas.

Baldt Patent Stockless Anchor.

Made of the finest quality of open-hearth steel and constructed on the ball and socket principle.

Many points of superiority over ordinary Stockless Anchors.

**BALDT ANCHOR COMPANY,
CHESTER, PA.**

WALTER MILLER, Western Reserve Bldg.,
Cleveland, Ohio,
Representative for the Great Lakes.



**Bement, Miles & Company,
PHILADELPHIA, PA.**

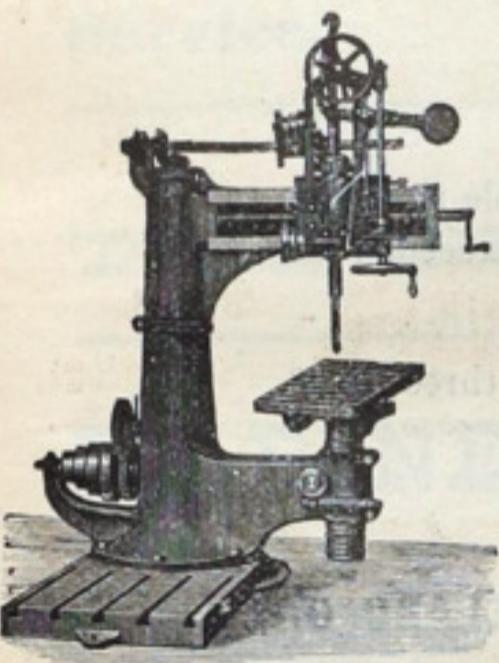
MANUFACTURERS OF

Metal Working Machine Tools

For Ship Yards, Railroad Shops, Locomotive and Car Builders, Machine Shops, Rolling Mills, Steam Forges, Boiler Shops, Bridge Works, etc., etc.

Steam Hammers, Steam and Hydraulic Riveting Machines.

New York Office: Taylor Bldg. No. 39 Cortlandt St.
Chicago Office: 1534 Marquette Building.



**ALMY'S PATENT
SECTIONAL
Water-Tube • Boilers.**

NOW USED IN

18 Passenger Boats from 70 to 180 feet long.
27 Steam Yachts from 50 to 180 feet long.

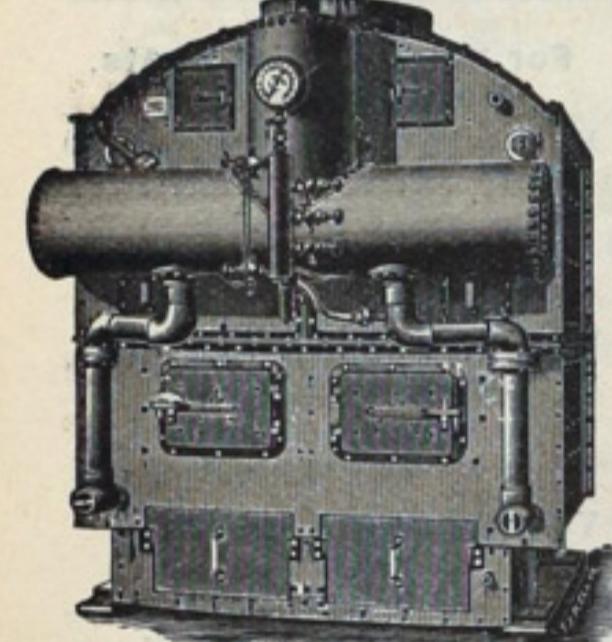
U. S. Torpedo Boat "Stiletto."

Numerous Small Launches and Stationary Boilers are giving most excellent results.

ALMY WATER-TUBE BOILER CO.,

No. 178-184 Allens Avenue,
near Rhodes St.

PROVIDENCE, R. I.



SELLER'S RESTARTING INJECTOR.

For Stationary, Portable, Traction Engines, Tugboats, &c. Thoroughly Reliable—Perfectly Automatic. JENKINS BROS.—Selling Agents, NEW YORK, BOSTON, PHILA., CHICAGO.

For Stationary, Portable, Traction Engines, Tugboats, &c. Thoroughly Reliable—Perfectly Automatic. JENKINS BROS.—Selling Agents, NEW YORK, BOSTON, PHILA., CHICAGO.

For Stationary, Portable, Traction Engines, Tugboats, &c. Thoroughly Reliable—Perfectly Automatic. JENKINS BROS.—Selling Agents, NEW YORK, BOSTON, PHILA., CHICAGO.

VANDUZEN Steam JET PUMPS
THE BEST IN THE WORLD.
Pumps any kind of Liquid. Always in order. Never clogs nor freezes. Fully Guaranteed. COST \$7 AND UPWARD. Especially useful for Mines, Quarries, Pits, Wells, Clay Pits, Breweries, on Steamships, Ferryboats, Sugar Plantations, etc. A full stock always on hand.

Descriptive Catalogue and Prices furnished Free. THE E. W. VAN DUZEN CO., CINCINNATI, O.

FRANKLIN HOUSE
ESTABLISHED 1837.
Cor. Bates and Larned Sts., DETROIT, MICH.

Only a Block from Woodward & Jefferson Aves. Very Central Near All Car Lines.

Per Day, \$1.50. H. H. JAMES, Prop.



Paint your
Vessels with

Superior Graphite Paint.

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments. Strictly anti-rust, and most durable and economical.

DETROIT GRAPHITE MFG. CO., 541 River St., Detroit, Mich.

DIXON'S Lubricating Graphite

Is fully explained in an INTERESTING AND INSTRUCTIVE PAMPHLET which is FREE to all interested. It will pay all Engineers and Machinists to SEND FOR IT.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

Chas. Cory & Son

Manufacturers of the
Mechanical and Electric
Marine Telegraph,

Electrical
Helm Indicators
Electric Call
Bells.

Engine Bells and
Brass Work of
all descriptions,
Shrieking and
Siren Whistles.

278 DIVISION ST.,
NEW YORK CITY.

NEVERSINK CORK JACKET AND LIFE BELT.

Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors. Consolidated Cork Life Preservers. Superior to all others. Ring Buoys and Fenders.

SAFEST. CHEAPEST. Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Vessels and the trade supplied. Send for catalogue. Awarded four Medals by World's Columbian Exposition



Metallic Life Rafts, Marine Drags. Manufacturer of Woolsey's Patent Life Buoy, which is the lightest, cheapest and most compact Life Raft known.

Send for Illustrated Catalogue.
Get our prices before buying elsewhere.

D. KAHNWEILER,
437 Pearl Street, NEW YORK CITY.

The "DAVIS" Pressure Regulator and Reducing Valve.

Is the simplest and best for reducing the pressure to Steam Steering Engines, Donkey Engines, Steam Winches and all places requiring a uniform pressure below that of boilers.

No diaphragms, spring or packing. Cut shows scale weights. We can furnish lever and sliding ball weight if preferred.

MANUFACTURED BY
G. M. DAVIS & CO.
106 N. Clinton St., CHICAGO, ILL.

FOR SALE BY
R. E. Hills, Chicago. O. H. McCutcheon, Buffalo
Geo. Worthington Co., Cleveland.
P. M. Church, Sault Ste. Marie. Jas. Walker & Son, Detroit.
Jas. Clements & Son, Bay City, Mich.
Cleveland Ship Building Co., Cleveland.
Chicago Ship Building Co., Chicago.

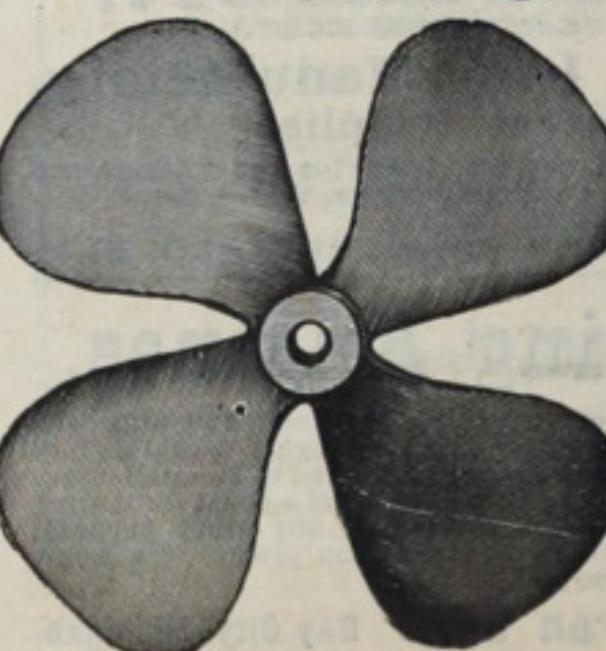
Selling agents—The McIntosh-Huntington Co., Cleveland, O.; The Detroit Sheet Metal and Brass Works, Detroit, Mich.

SHERIFFS MANUFACTURING COMPANY,

Manufacturers of

Propeller

Wheels.



**MARINE ENGINES AND
REPAIRS.**

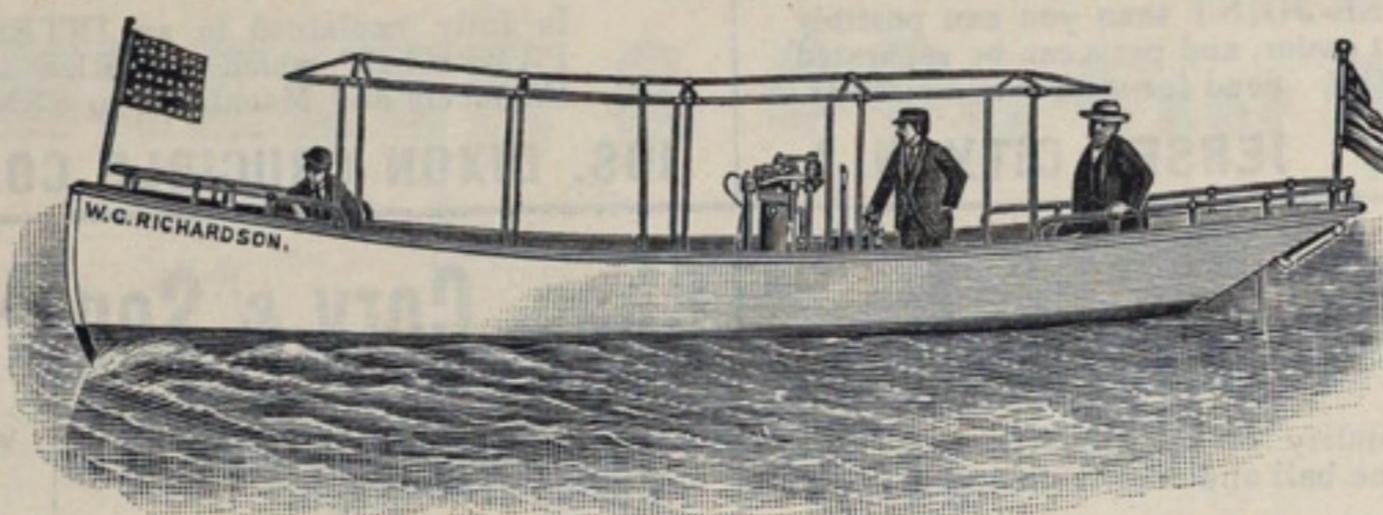
**Milwaukee, Wis.:
I TELEPHONE S.-163.**

The Wootters Gas Engine.

Especially adapted for launches and ferry boats. Fitted with friction clutch or reversible shaft.

These engines are giving entire satisfaction in the pleasure yacht W. C. Richardson and the delivery launch Lotta.

Prices and particulars furnished on application.



NAPHTHA LAUNCH W. C. RICHARDSON, (Engine 8 horse power—speed 8 miles an hour.)

BUILT BY THE . . . McMYLER MFG. CO., GAS ENGINE DEPARTMENT, 180 Columbus St., CLEVELAND, O.

1897—Blue Book of American Shipping—1897

"IT IS BETTER TO BOAST AFTER THE BATTLE."

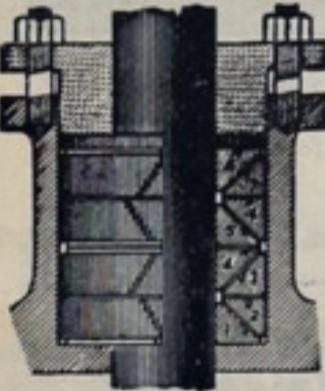
The publishers of the 1897 Blue Book are using their energy to make the 1897 Blue Book more valuable than the 1896 Blue Book. Last year we promised to get out a book that would be satisfactory. The result exceeded all expectation and was pronounced far superior to any lake directory ever published.

The value of a directory consists in the frequency to which it is referred to. The Blue Book is used three times to one, more than any other—because it is reliable.

If you want to advertise in or subscribe for the best marine directory ever published, write, at once,

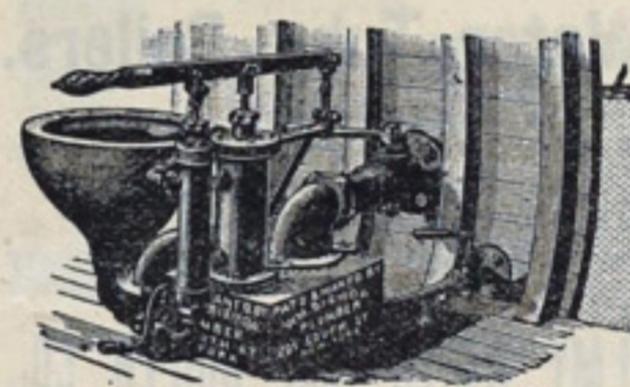
BLUE BOOK OF AMERICAN SHIPPING, 409 Perry-Payne Bldg., CLEVELAND, O.

KATZENSTEIN'S Self-Acting METAL PACKING,



For PISTON RODS, VALVE STEMS, etc., of every description, for Steam Engines, Pumps, etc., etc.
Adopted and in use by the principal Iron Works and Steamship Companies, within the last twelve years, in this and foreign countries.
FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints.
DOUBLE-ACTING BALANCED WATER-TIGHT BULKHEAD DOORS for Steamers. Also Agents for the McColl-Cumming PATENT LIQUID RUDDER BRAKE. For full particulars and reference, address:
L. KATZENSTEIN & CO.,
General Machinists, Brass Finishers, Engineers' Supplies,
357 West St., New York.

Patent Pump Water Closet.



For Yachts, Pilot Boats, Naval Ships, Etc.

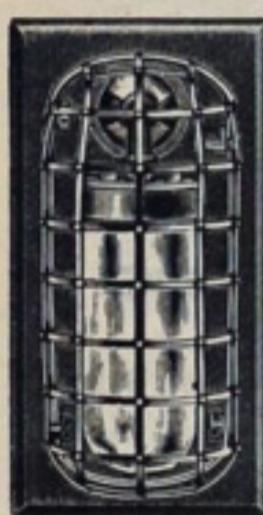
For above or below water line. In use on U.S. Cruiser New York, Columbia, and Battleships Indiana, Maine, Texas, Massachusetts, Etc. Our No. 4 can be put in a space 14 in. x 15 in.

WILLIAM BISHOP & SON,

205 South St., NEW YORK.
724 Third Av., BROOKLYN.

Telephone 569 Franklin.

Yacht Fittings a Specialty.



Ship Lamps

OIL AND ELECTRIC FIXTURES

FOR

Steamships, Yachts, &c.

GREAT VARIETY OF DESIGNS.

Prices and Cuts on Application.

PAGE BROS. & CO.

347 to 357 Cambridge St. Boston, Mass.

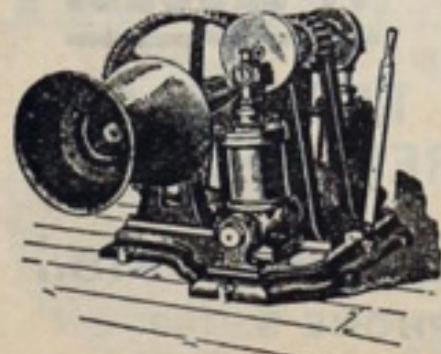


C. H. McCUTCHEON.
(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 62. No. 18 Ohio Street, BUFFALO, N. Y.



Hoisting Engines.

We build them in all sizes from new and improved designs. Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a Hoist for marine work, dock work, mining or any other purpose, kindly permit us to name you prices. We know we can please you.

Marine Iron Co., Bay City, Michigan.

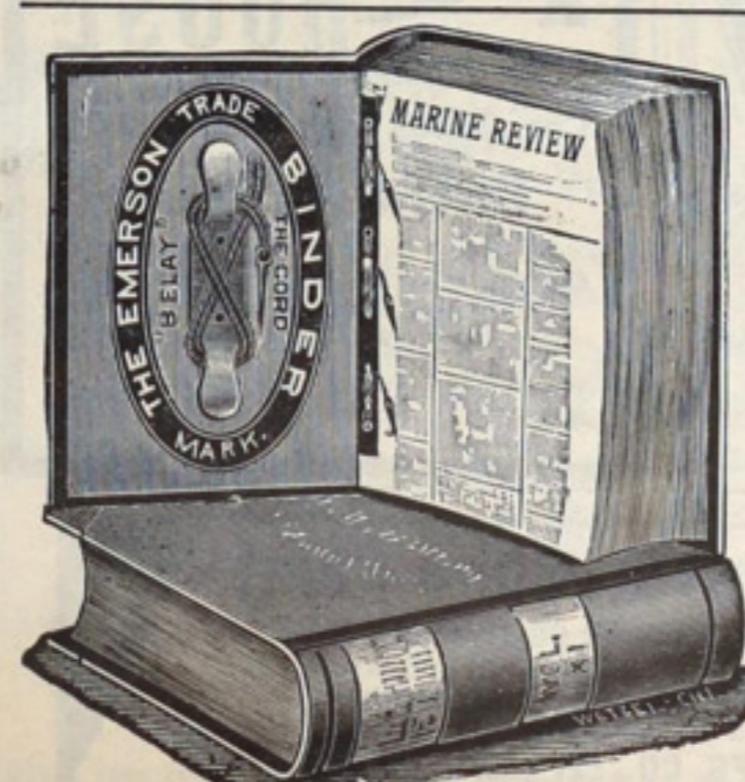
MIERS GORYELL
21 E. 21st Street, NEW YORK.

Consulting Mechanical Engineer.

Plans, Specifications and Superintendence. Marine and Water Works Engines and Boilers.



JENKINS BROS. New York, Boston, Philadelphia, Chicago



ONE OF THESE BINDERS

that will hold 52
NUMBERS
of the

MARINE REVIEW,

Will be mailed to
any address on
receipt of \$1.

MARINE REVIEW...

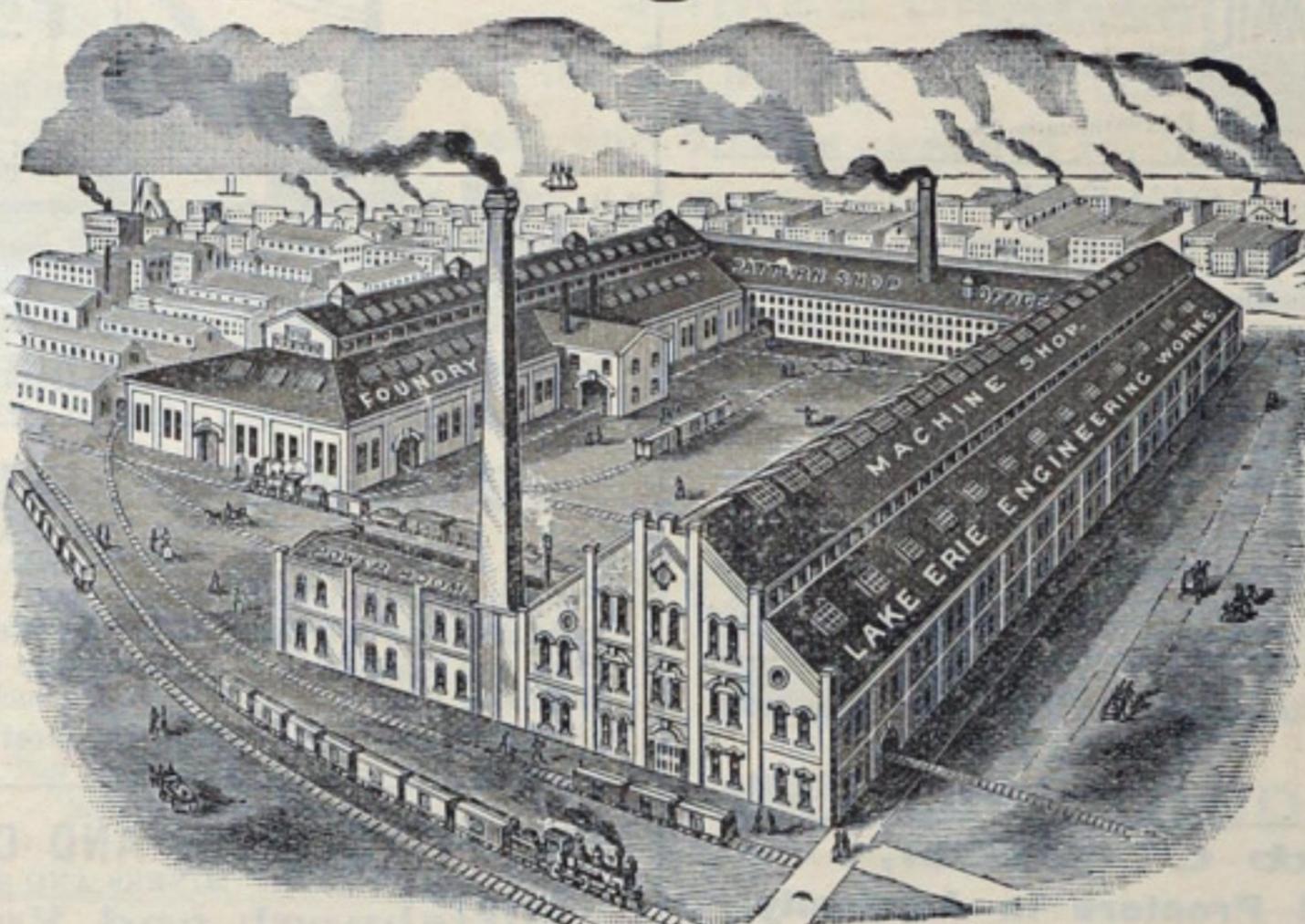
409 Perry-Payne Bldg.,
CLEVELAND, O.

Lake Erie Engineering Works, Buffalo, N.Y.

RICHARD HAMMOND, Pres't.

JOHN COON, Sec'y and Treas.

**Steam Engines,
Compound, Triple
and Quadruple
Expansion
Engines,
From 250 to 10,000
Horse Power
For Marine and
Stationary
Service.**



**Special Designs
for Cable
Railways and
Electric Power
Plants.**

**The Best Economy
and Regulation
Guaranteed.**

THE BEST EQUIPPED PLANT IN AMERICA.

MARINE VALVE OIL FOR INTERNAL LUBRICATION.

Marine Valve,
Renown Engine,Eldorado Engine,
Crank Case,Victor Signal,
Dark Lubricating,Mineral Seal,
Head Light,Artic Cup Greases,
and Lard Oils.

— CARRIED IN STOCK AT THE —

RENNOWN ENGINE OIL FOR EXTERNAL LUBRICATION

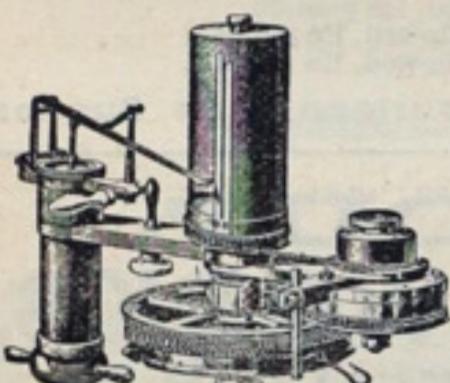


STANDARD OIL COMPANY'S MARINE DEPOT,

TELEPHONE 77.

123 River Street, CLEVELAND, O.

MAIN OFFICE TELEPHONE 682.

ALSO FOR SALE
BY
STANDARD OIL
COMPANY,Chicago, Ill., No. 5 Wabash Ave.
Racine, Wis.
Milwaukee, Wis., Broadway & Mason.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.Marinette, Wis.
Oshkosh, Wis.
Duluth, Minn.
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.Buffalo, N. Y.
Sault Ste. Marie, Mich.
West Bay City, Mich., M.C.Ry. & 10th St.
Saginaw, Mich., Eighth & Sears Sts.
Detroit, Mich., 46 Jefferson.
Toledo, O., Summit & Monroe Sts.ATLANTIC REFINING COMPANY, French & 18th Sts., Erie, Pa.
D. ROBESON, Port Huron, Mich.
W. S. MCKINNON, Ashtabula Harbor, O.
HULL & RAND, Huron, O.EDWARD BRAMMALL, Benton Harbor, Mich.
BABY & DALE, St. Clair, Mich.
N. C. ALLEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.A. H. McGONAGIL, South Chicago, Ill.
MARINE SUPPLY Co., Fairport, O.
F. KRAZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY Co., Toledo, O.

TWIXT YOU AND I

The **ENGINEER** that don't **OWN** an **INDICATOR** or carry in his closet some **EUREKA PACKING** is behind the age. The former enables you to tell how your engine is working. The latter makes the engine work smoothly. Send for Catalogue.

INDICATOR. \$40. **WHEEL. \$15.**
JAS. L. ROBERTSON & SONS,
Successors to Hine & Robertson Co.
40 Cortlandt St., N.Y.

EVERY MARINE ENGINEER
on the Lakes, and every second
who is studying for first class
papers, ought to possess



Reed's Engineers' Hand Book

(Fifteenth Edition.)

Containing 600 engravings and a portfolio of drawings of all parts of marine engines.

It has always sold for \$4.50 and \$5. Until Dec. 1 any subscriber to the **REVIEW** may have a copy sent post paid by enclosing this advertisement and \$4 to



BOOK DEPT.

409 Perry-Payne Bldg., CLEVELAND, O.

Marine Review,

HANDSOME PHOTOGRAPHS AT REDUCED PRICES.

We have been selling 11x14 photographs taken in Detroit River for \$1.50 each. For the next ten days we will sell prints of the following at \$1.00 each, the price on others remaining the same:

Commodore.	Northern Light.
Pontiac.	Republic.
Spokane.	Gladstone.
Centurion.	Frontenac.
Edwards and Golden Age.	J. H. Devereaux.
Kearsarge.	Eber Ward.
Geo. Spencer and Pennington.	John Harper.
Scranton.	Fred Pabst.
Majestic.	Tom Adams.
Sir Henry Bessemer.	Bielman.
Stafford.	Siemens.

Having more than one of each of these, this price is made to reduce the stock.

MARINE REVIEW, Cleveland, O.

STEAM..
ENGINEERING
(Loco., Stat'y. and
Marine); Electricity;
Mechanics; Mechanical
and Architectural
Drawing; Plumbing;
Architecture; Mining;
Civil Engineering in
all Branches.
The International
Correspondence Schools



To Steam..
Engineers,
Machinists, Electrical
Workers, Civil Engi-
neers, Draughtsmen,
Steam Fitters, Miners,
Carpenters, Plumbers.
References Everywhere.
Send for Circular.
State Subject you wish
to Study,
BOX 965 Scranton, Pa.

HARVEY D. GOULDER,
LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

ALBERT J. GILCHRIST, PROCTOR IN ADMIRALTY,
No. 604 PERRY-PAYNE BLDG., CLEVELAND, OHIO.

AMBROSE V. POWELL, C.E., * * Consulting Engineer.
Specialties: Designing and Construction of DRY DOCKS, Harbor Works,
Docks and Plants for Handling Coal and Ore.
Office, 507 Chamber of Commerce, CHICAGO, ILL.

C. E. KREMER, Attorney and Counselor-at-Law and
Proctor in Admiralty.
Rooms 14, 15 and 16, Bryan Block, 164 LA SALLE ST., CHICAGO, ILL.

BROWN & COOKE,
Counselors at Law and Proctors in Admiralty,
34-35-36 White Building, BUFFALO, N. Y.

HAWGOOD & MOORE
Vessel and Insurance Agents,
Residence Phone, Doan 446—W. A. Hawgood.
Long Distance Tel. 2395. 608 Perry-Payne Bldg., CLEVELAND, O.

W. C. RICHARDSON,
VESSEL AND MARINE INSURANCE AGENT.
Office Telephone 338.
Residence Telephone 2938. Nos. 606 & 607 Perry-Payne Bldg., Cleveland, O.

C. F. PALMER. C. L. HUTCHINSON.
PALMER & CO.,
VESSEL AGENTS AND UNDERWRITERS,
Telephone 644. 515 and 516 Perry-Payne Bldg., Cleveland, Ohio.

J. H. BARTOW.
C. P. GILCHRIST.
BARTOW & GILCHRIST, TELEPHONE 717.
Vessel and Insurance Agents,
611 and 612 Perry-Payne Bldg., Cleveland, O.

ALEX. CLARK. J. B. HALL. J. H. KILLERAN,
VESSEL AND INSURANCE AGENTS,
Tel. No. 892. 55 Main St., BUFFALO, N.Y.

JOHN MITCHELL. JOHN F. WEDDOW. ALFRED MITCHELL.
MITCHELL & CO.,
Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO
Office Telephone, 767. Residence, John Mitchell, 3506.

C. R. JONES & CO., VESSEL AGENTS,
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

ORESTES C. PINNEY,
Lawyer and Proctor in Admiralty.
Rooms 722 and 723 Perry-Payne Bldg.
CLEVELAND, OHIO.
Telephone 2585.

C. W. ELPHICKE. JAS. A. MYERS.
A. L. FITCH.
C. W. ELPHICKE & CO.
GENERAL INSURANCE AGENTS,
Room 10, No. 6 Sherman St., Chicago, Ill.

PATENTS

QUICKLY SECURED. Trade-marks and Copyrights registered and patent business of every description promptly and skillfully conducted at lowest rates. Inventions introduced, companies formed, and PATENTS SOLD ON COMMISSION. 25 years' experience. Highest references. Send us model, sketch or Photo. of invention, with explanation, and we will report whether patentable or not, free of charge. OUR FEE PAYABLE WHEN PATENT IS ALLOWED. When patent is secured we will conduct its sale for you without extra charge. 32-PAGE HAND-BOOK and list of 200 inventions wanted mailed to inventors free upon request. This is the most complete little patent book published and every inventor should WRITE FOR ONE. H. B. WILLSON & CO., Patent Solicitors, Le Droit Bidg., WASHINGTON, D. C.

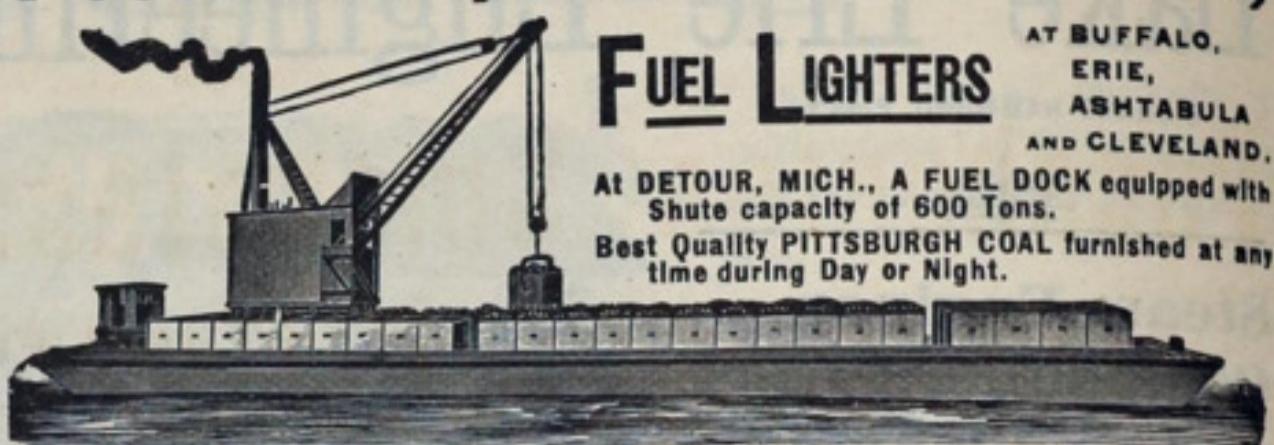
H. S. LORD. J. H. NORTON.
LORD & NORTON,
Attorneys-at-Law,
Proctors and Advocates in
Admiralty,
DULUTH, MINN.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,
AND
Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND. - OHIO.

J. T. ROSE. FRANK B. LAZIER.
ROSE & LAZIER,
Vessel Agents and Brokers,
and Marine Insurance,
16 Board of Trade,
DULUTH. - MINN.

THOS. WILSON,
MANAGING OWNER
WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

Pickands, Mather & Co.,



FUEL LIGHTERS

AT BUFFALO,
ERIE,
ASHTRABULA
AND CLEVELAND.

At DETOUR, MICH., A FUEL DOCK equipped with
Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any
time during Day or Night.

Western Reserve Building, CLEVELAND, O.

Ohio & Pennsylvania Coal Co.

FUEL DEPARTMENT. MINERS AND SHIPPERS,

Youghiogheny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with Revolving Derrick and (100) two ton buckets.

Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.

THE PITTSBURGH AND CHICAGO GAS COAL CO.

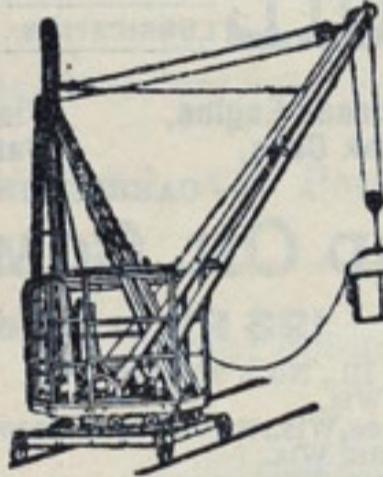
MINERS AND SHIPPERS OF

Pittsburgh and Youghiogheny Coal.

Fuel Docks West Side of Main River, Cleveland, Ohio, just above Main St. Bridge. Latest equipment for rapid fueling of Steamers at all hours, day or night. Fuel Lighter 300 tons capacity; buckets 2½ tons capacity.

Office 1888.
Telephone { Fuel Dock 1590.
Ore Dock, 2413.

J. A. DONALDSON, Agent,
420-421 Perry-Payne Building.



TOLEDO FUEL CO.,

Cambridge, Hocking, Jackson
and Massillon Coal

Wheeled on or put on with DERRICK.
NIGHT OR DAY.

SATISFACTION GUARANTEED.

H. H. WILLIAMS, Manager.

Located on Penn. Dock, TOLEDO, O.
GET OUR PRICES. Phone 1441.

H. A. BARR, PRESIDENT, F. H. VAN CLEVE, Secy. CAPT. GEO. BARTLEY, SUPT.
Escanaba. Escanaba. Escanaba. Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawser, Hydraulic Jacks and Diving Appliances always ready.

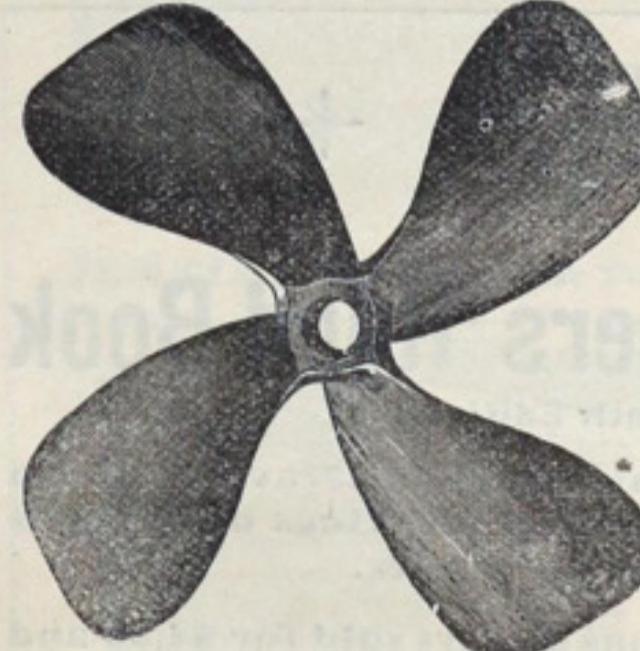
TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch Stroke, Steam Pressure Allowed, 125 pounds.

TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.

TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.

CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction

H. G. TROUT, KING IRON WORKS, BUFFALO, N. Y.



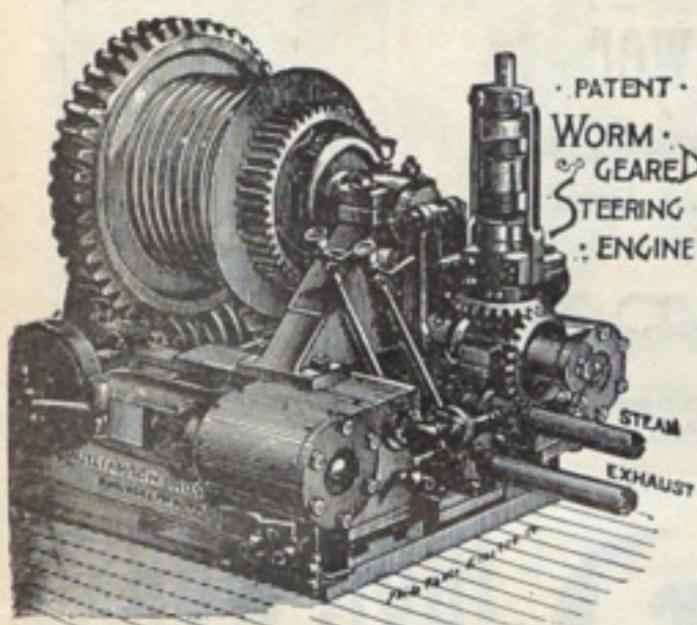
MANUFACTURERS OF
TRIPLE EXPANSION,
THREE CYLINDER,
FORE AND AFT
And STEEPLE COMPOUND
MARINE ENGINES,
High and Low Pressure Engines,
Sectional Propeller,
Tug and Yacht Wheels,
Cowles Aluminum and Manganese
Bronze Propeller Wheels.

These Wheels are noted for their extra
speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

A CHART OF THE WHOLE OF GEORGIAN BAY,

The best thing of its kind as yet published, has recently been issued by the British admiralty, and may be had from the MARINE REVIEW, No. 409 Perry-Payne building. Another chart, of a very clear and interesting kind, taking in Lake Huron, Georgian Bay, Lake Erie and connecting channels has also been issued recently by the same authority.



Hoisting and Steering ENGINES.

With either Frictional, Spur or Worm Gear of various patterns to suit all purposes.

Williamson Bros.

Richmond and York Sts.
PHILADELPHIA, PA.

Over 150 of the largest and most modern lake steamers have our steerers.

THE W. L. SCOTT CO.

Wholesale Dealers in

Shamokin, Wilkesbarre, and Hazleton-Lehigh
COALS.

Mansfield Steam Coal.

FUELING VESSELS a specialty, either from dock or steam scow Mansfield, capacity 300 tons, in buckets, which gives quick dispatch. Boats coaled day or night. Docks lighted with electricity and equipped with steam derricks.

Fueling Office at Canal Dock, ERIE, PA.



ALKALI WATER PURIFIER!

A Pure Chemical for the safe Removal and Prevention of Scale in Steam Boilers. In use by many of the larger steamship lines on the great Lakes. Guaranteed.

MANUFACTURED BY

THE J. H. PARSONS CHEMICAL CO.,
1509 Masonic Temple, CHICAGO, ILL.

WANTED.

Compound Engine, Shaft and Propeller.

Engine should be about 6 by 10 by 10 inches stroke, and propeller available for a boat 41 by 11 by 4 feet draft. Price must be low, and must include freight charges.

JULIUS L. LEE.

3 Habershaw St., SAVANNAH, GA.

Feb. 25.

Dock Managers and Manufacturers of Hoisting Machinery:

YOU ARE INVITED TO INVESTIGATE

FERRALL'S PATENT LONG-BEARING, SELF-ADJUSTING 5 ROLL SHEAVE

If you want the least Friction.

Manufactured Solely by the

BAGNALL-LOUD BLOCK CO.

162 Commercial St., - BOSTON, MASS.

The Rochester & Pittsburgh Coal & Iron Co. Reynoldsville Coal.

STEAMBOAT FUEL DOCK. Blackwell Canal at Michigan St. Bridge.
1400 Feet Dock Frontage.

Steam Elevator and 4 Steam Derricks. Steam Fuel Scow, Capacity 550 Tons. Boats Coaled Day or Night.

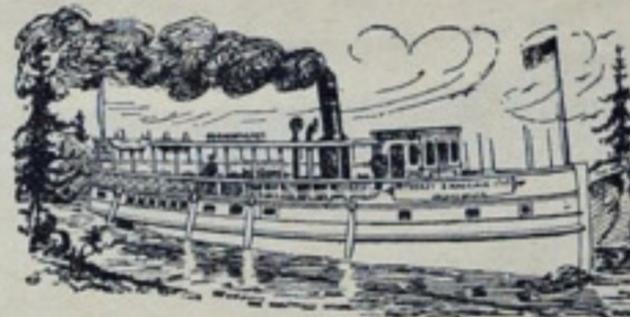
OFFICE: 694 Elliott Square Bldg., BUFFALO, N.Y.

TELEPHONES:

Ellicott Square Bldg., Seneca 371 A. Dock, Seneca 371 D.

WM. H. HAZEN, Dock Superintendent.

For Sale.



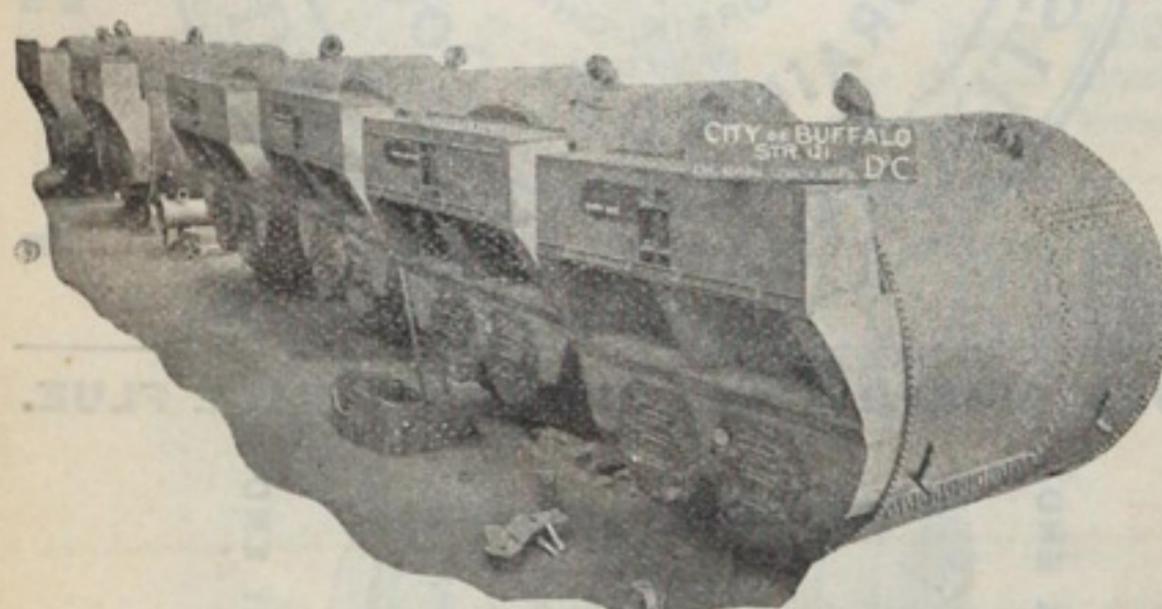
Steamers
Romeo
and
Juliet.

These beautiful twin steamers just removed from dry dock. Hulls of heavy oak and in first class condition, recaulked, repainted, refitted, new stacks, new large wheels, large engines, increased speed and each boat fully equipped with metal rafts, life boats, life preservers and fire pumps. Licensed to carry 200 passengers each, and built for both lake and river navigation. Cabins, single deck, twin screws, two sets engines each. Boilers better than new. Length 80 ft., beam 19 ft. Built in 1891. Original cost \$19,000; to be sold outright. No lease or trade. Now laying at Detroit, Michigan, and can be seen at W. H. Oades ship yards. Address,

BENJAMIN SHURTLEFF, Owner,
Oakdale and North Fremont Sts., CHICAGO.

Air is Cheap—Cheaper than Dirt!

**FUEL IS DEAR—VERY DEAR!
USE AIR AND SAVE FUEL!**



Six Boilers with Howden Hot Draft appliances now in Side-Wheel Steamer City of Buffalo. Dimensions of each boiler—12 ft. 6 in. diameter by 12 ft. length.

ECONOMY in operating expenses on Lake Ships must come from reduced coal bills. No great saving can be made in labor cost, and provisions are already low. But fuel bills can be lowered and cheap coal used to advantage by adopting Modern Methods of making steam at low cost.

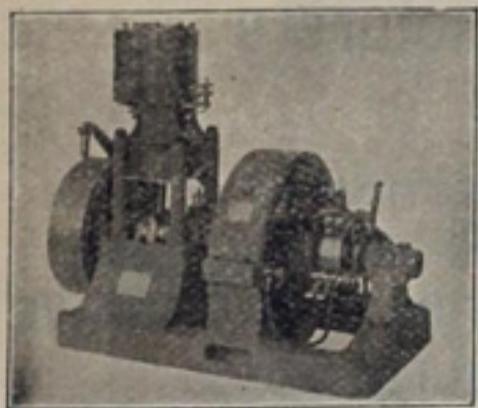
No manufacturer of pig iron would to-day think of running his furnace without a hot blast. Competition would not permit it. This same competition demands advanced practice in the operation of ships. The same principle is applied in the

HOWDEN HOT DRAFT

Now in use on Lake Steamers aggregating over 40,000 Horse Power.
CAN BE APPLIED TO OLD SHIPS AS WELL AS NEW ONES.

No complicated machinery. Cool engine rooms and cool fire holds. Estimates readily furnished for application of this draft to any steamer.

DRY DOCK ENGINE WORKS, DETROIT, MICH.



Complete Electric Plants for Light and Power

On STEAMSHIPS, WHALEBACKS, YACHTS, DOCKS, WHARVES, Etc.

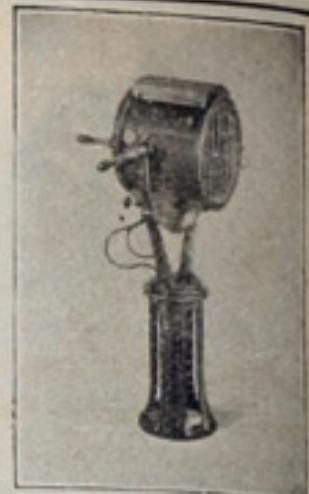
Our system is complete in every detail. All our appliances are made to Governmental and Insurance requirements and are perfect. Write for prices and catalogues.

General Electric Company.

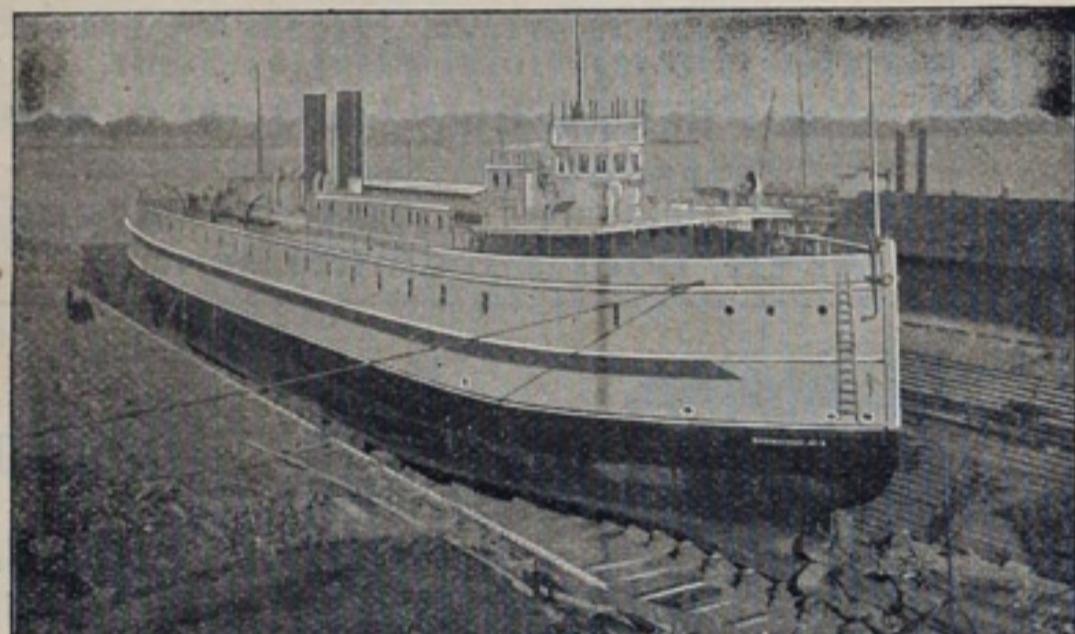
Schenectady, N. Y. Chicago, Ill.
Boston, Mass. Philadelphia, Pa.
New York, N. Y. New Orleans, La.

SALES OFFICES

Detroit, Mich. Buffalo, N. Y. Columbus, O.
Baltimore, Md. Portland, Ore. San Francisco, Cal.



FRONTIER IRON WORKS MARINE ENGINES, DETROIT, MICH.



Shenango No. 2, 300 feet long, 54 feet beam.

CRAIG SHIP BUILDING CO.

TOLEDO, OHIO,

Metal & Wooden Ship Builders.

New Dry Dock—450 feet long, 110 feet wide on top,
55 feet wide on bottom, 16 feet of Water on Sill.

**Repairs to Metal and Wooden Ships
A Specialty.**

—THE— Bethlehem Iron Company

WORKS and PRINCIPAL OFFICE:

SOUTH BETHLEHEM, PENNA.

Steel forgings of all descriptions

For **Marine Engines**

Fluid Compressed, Hollow, Hydraulic Forged
and Annealed Forgings a Specialty.

NEW YORK OFFICE, - - - 100 Broadway.

PHILADELPHIA OFFICE, - - - 421 Chestnut St.

CHICAGO OFFICE, - - - Marquette Bldg.

The United States Standard Register of Shipping.

Providing the only Standard Classification based on Construction Rules
Designed for Lake Vessels.

Classed Vessels Receive the Lowest Rates of Insurance.

SURVEYORS.

SINCLAIR STUART, Surveyor of Iron and Steel Construction and Engineer Surveyor.

for District comprising Lakes Superior, Michigan and Huron and Lake Erie, as far East as, and including Cleveland, O.

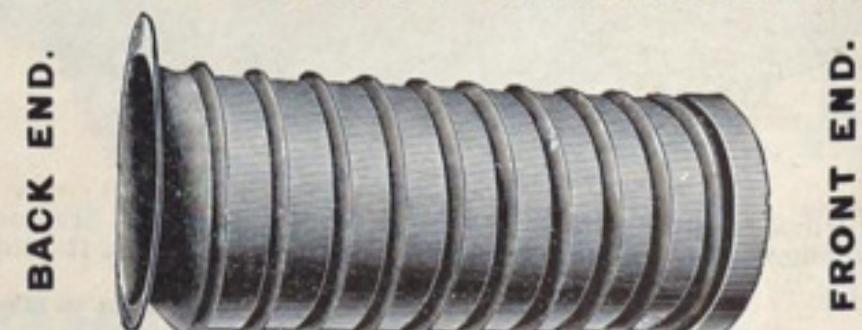
EDWARD GASKIN, Potter Building, Main Street, Buffalo, N. Y., Surveyor for District comprising Lake Ontario and Lake Erie, as far West as, but not including Cleveland, O.

Application for survey of vessels and subscriptions to Register Book will be received by the surveyors or at the office of

The United States Standard Steamship Owners', Builders' & Underwriters' Ass'n, Ltd.
Post Building, 16 and 18 Exchange Place. NEW YORK.



PURVES' RIBBED STEEL BOILER FURNACE FLUE.



BACK END.

FRONT END.

With this style of Furnace Flue, the rivets at the "back end" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any other part of the boiler. No smith work is required to fit it in a boiler or to replace it when replaced. It is ready for use as it comes from the manufacturers. This style of flue has been in use six years without a single complaint.

Over 16,000 of Purves' Ribbed Steel Furnace Flues in successful use in Marine Boilers.

ELLIS & EAVES SYSTEM OF INDUCED OR SUCTION DRAFT.

CHARLES W. WHITNEY,

Sole Agent for the United States and Canada,
Manhattan Life Building, 64, 66 and 68 Broadway, New York.

S.F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.
320 ATWATER STREET,
DETROIT, MICH.

THE BABCOCK & WILCOX CO. FORGED STEEL WATER-TUBE MARINE BOILER,

29 CORTLANDT ST., NEW YORK.

Boilers sold to United States Merchant Marine and Yachts 16,500 H.P.
Boilers sold to United States Navy 7,500 "

The only Water-tube Boiler in the British Merchant Marine 15,500 "

BAR IRON THE BOURNE-FULLER CO. PIG IRON

SHIP PLATES,

BOILER PLATES,

ANGLES,

BEAMS,

BARS,

BOAT SPIKES,

CHANNELS,

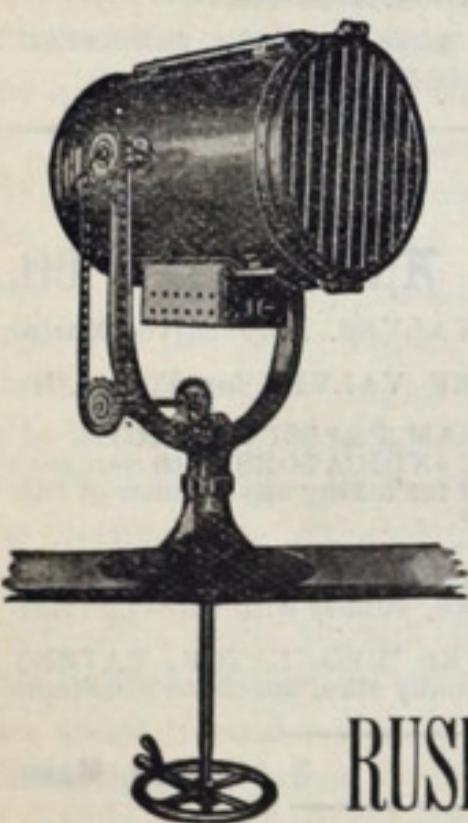
CLINCH RINGS,

SALES AGENTS:

THE CAMBRIA IRON CO.

—Mfrs. of Open Hearth and Bessemer Steel.—

De Grauw, Aymar & Co.,
34-35 South Street,
NEW YORK, N. Y.



PROJECTORS!

10 MILLION TO
100 MILLION
CANDLE POWER.
The only successful commercial light
Adopted and endorsed by leading
steamship lines and builders.
Have Replaced All Other Makes.
CATALOG NOW READY.

RUSHMORE DYNAMO WORKS,

Type D. Pilot House.

JERSEY CITY, N. J.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter

Carrying
Different
Grades
at all
Times.



M. A. HANNA & CO.,

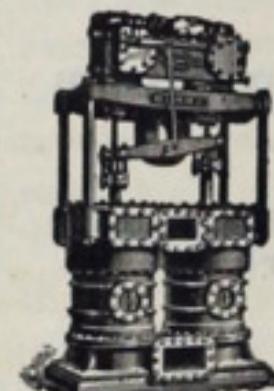
Main Office, Perry-Payne Bldg., Cleveland. Miners and Shippers.

THE GEO. F. BLAKE MFG. CO.

BUILDERS OF

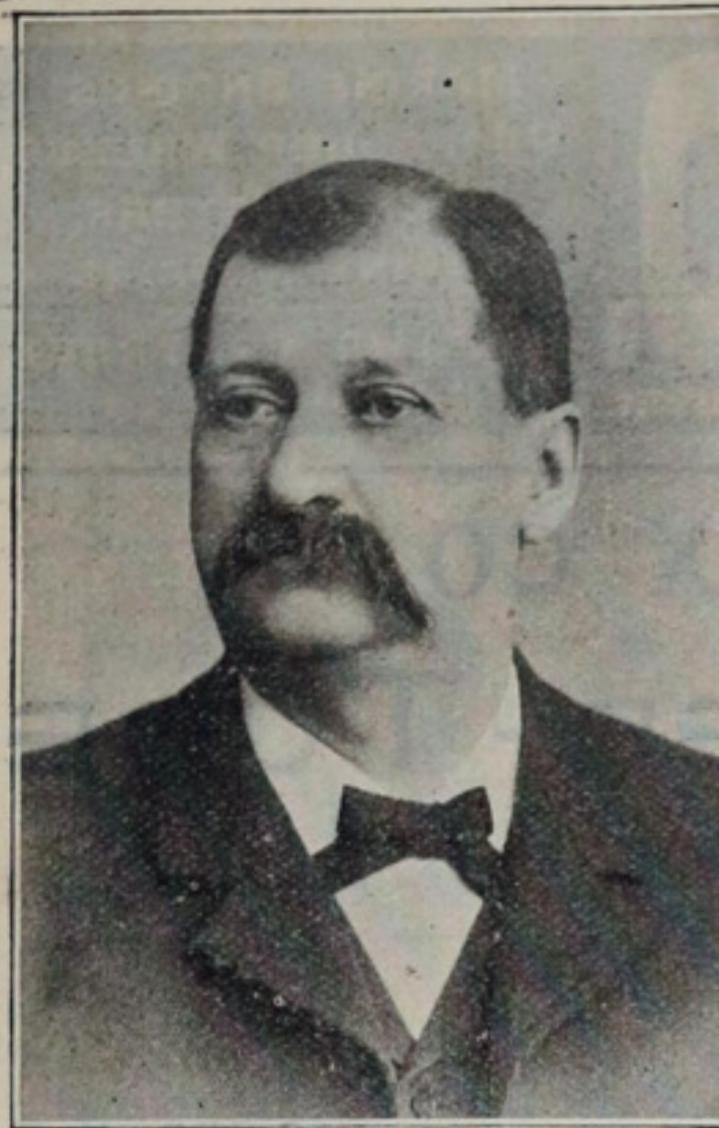
MARINE PUMPS

Single and Duplex Pumps for Boiler Feed,
Fire or Bilge Service—Vertical and Horizontal.
Vertical and Horizontal Pumps, Air Pumps
for Surface and Jet Condensers.



AIR PUMP ON
U.S. CRUISER NEW YORK.

95 and 97 Liberty St., NEW YORK.

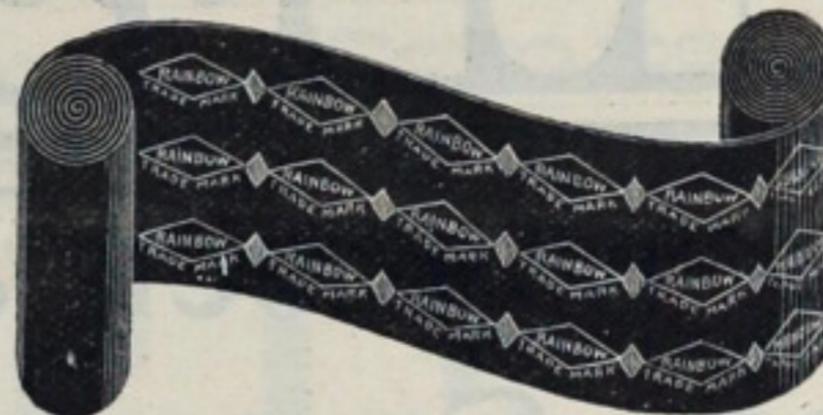


MR. JOHN H. DEMING,
General Superintendent Peerless Rubber Manufacturing Co.

The inventor of and the only man in the world who can make

RAINBOW PACKING.

Thousands of
Imitators.
No Equal.
Will Hold
Highest Pressure.



Don't have to use
wire and cloth
to hold.

RAINBOW.
Can't blow it out.

LOOK OUT FOR IMPOSTERS.

Commencing Dec. 1st, we use Three Rows of DIAMONDS IN BLACK extending throughout the entire length of each and every roll.

PATENTED AND MANUFACTURED EXCLUSIVELY BY

Peerless Rubber Manufacturing Co.

16-24 Woodward Ave.
Detroit, Mich.

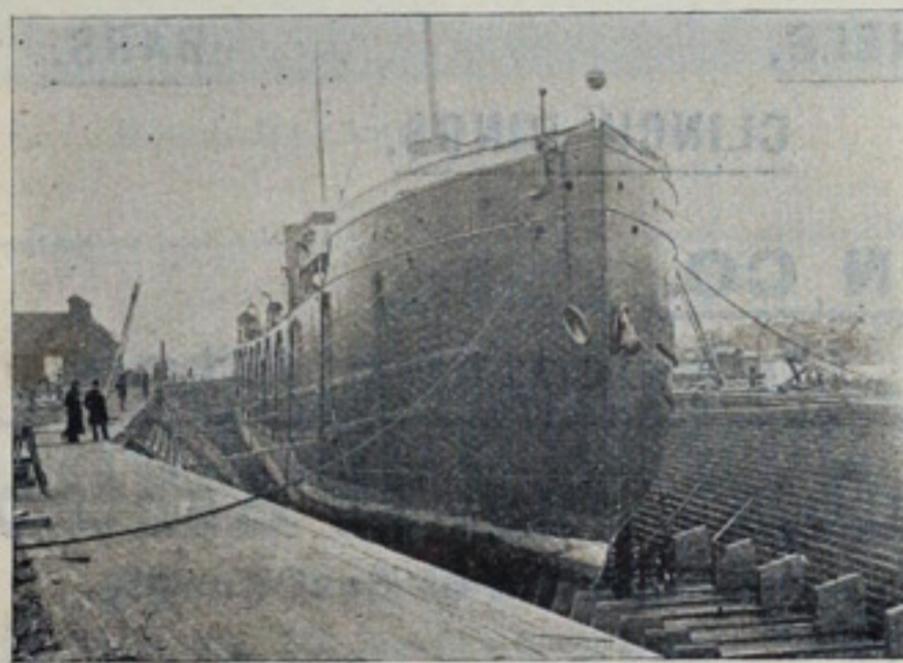
16 WARREN STREET,
NEW YORK.
193-195 Bank St., Cleveland, O.

202-210 So. Water St.
Chicago, Ill.

AMERICAN STEEL BARGE CO. STEEL and METAL SHIPS

Of all classes built on the Shortest Possible Notice at our yards at
West Superior, Wis., and also at Everett, Wash.

Plates &
Material
Always
on hand
to Re-
pair all
kinds of
Metal
Ships in
Shortest
Time.



Best
Quality
of Oak
instock
for Re-
pairing
Wooden
Vessels
of all
Classes.

SIZE OF DOCK.
Length, extreme.....537 feet. Entrance, Top.....55 feet 9 in
Breadth, Top 90 " 4 in. Entrance, Bottom.....50 "
Breadth, Bottom 52 " Depth over Sills18 "

LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propeller Wheels in stock at Dry Dock.

Cuddy-Mullen Coal Co.

Lake Shippers of Steam Coal.

FUELING DEPARTMENT FACILITIES:

CLEVELAND HARBOR—

Car Dumper; Eight Pockets; Three Steam
Derricks; Lighter.

DETROIT RIVER BRANCH—

Amherstburg, Steam Derricks; Sandwich,
Ten Pockets and Two Steam Derricks.

SAULT RIVER BRANCH—

Pocket Dock now under construction.

Good Coal; Courteous Attention; Quick Dispatch.

General Offices: Perry-Payne Bldg., Cleveland, O.

The Cleveland Dry Dock Co.

148 Elm St.,
Cleveland, O.

Telephone 1618.
Resid. 'Phone 4080.

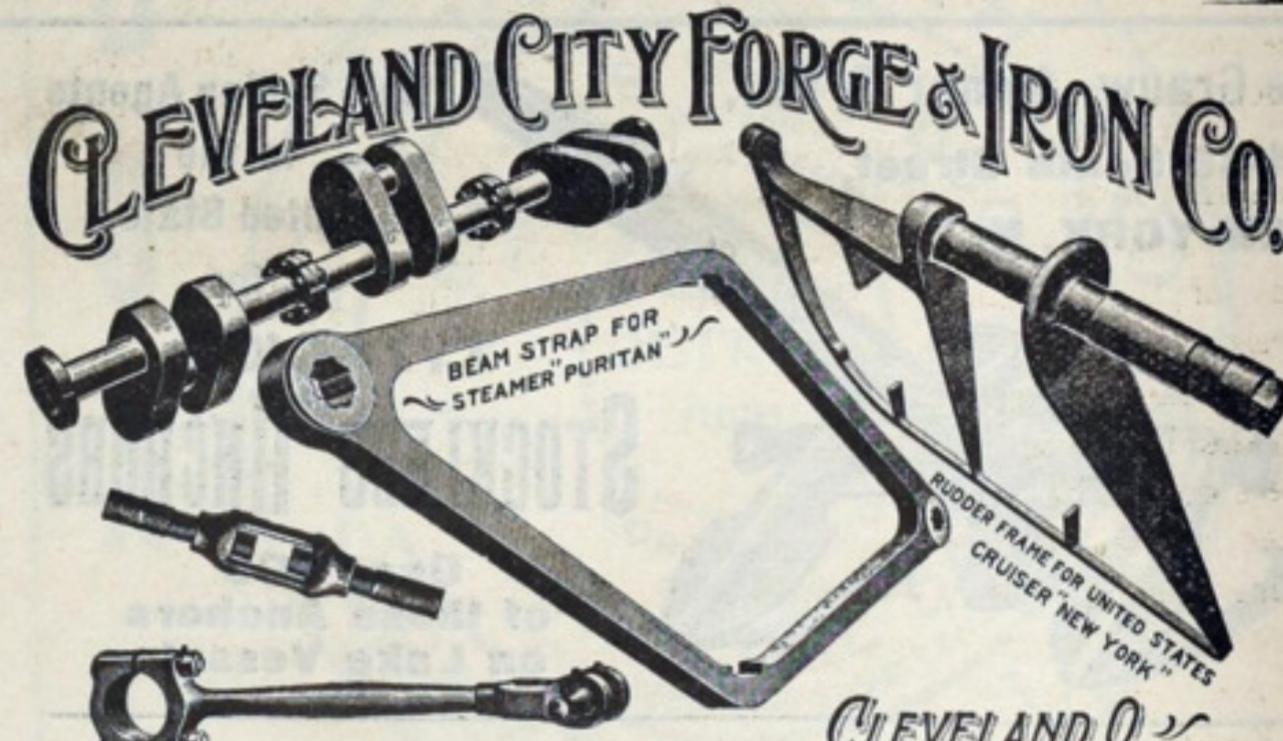


REPAIRING A SPECIALTY.

Dimensions of Dock:

Lth. over all, 380 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

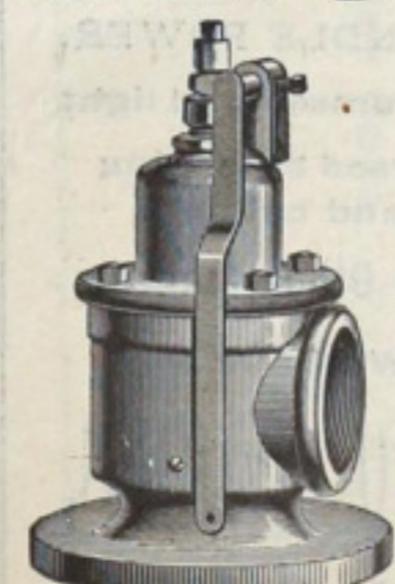
Capt. W. W. BROWN,
Sec'y & Mgr.



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

CROSBY

STEAM GAGE
AND VALVE CO.



CROSBY POP SAFETY VALVES. Locomotive, Marine and Stationery.
CROSBY WATER RELIEF VALVES, for Pumps, Hydrants, etc.
CROSBY IMPROVED STEAM PRESSURE GAGES.
CROSBY STEAM ENGINE INDICATORS, with Sargent's Electrical Attachment for taking any number of Diagrams simultaneously.

The Original SINGLE BELL CHIME WHISTLES.
BRADEN PUMP VALVES; rubber with wire-coil insertion.
BOSWORTH FEED-WATER REGULATOR, PATENT GAGE TESTER, and many other specialties in Steam Lines.

Main Office and Works:

Boston, Mass.

Stores: Boston, New York, London, Eng., and
78 Lake St., CHICAGO.

WE WILL REPAIR YOUR STEAM FITTINGS PROMPTLY.